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Hypothyroidism in Men in Industry

A Preliminary Report on Chemical Evidence

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• **Of 2,807 specimens from blood donors and men in industry, 340 or 12 per cent had serum protein-bound iodine values of 4.0 micrograms or less per 100 cc.**

In a selected group of 610 "white collar" workers, 52 or 8.5 per cent had similar low values.

Careful reexamination of a sample of the latter group indicated that at least 75 per cent of them had hypothyroidism needing treatment.

Further analysis of the factors producing hypothyroidism and the validation of the incidence found is warranted. If the incidence observed in this study is confirmed, these findings indicate that 6 per cent to 9 per cent, or more than a million middle aged American men have hypothyroidism.

IN THE LAST DECADE of the last century, Osler's textbook[19] was the standard source of information on the diagnosis and treatment of hypothyroidism. Osler credited Sir William Gull[9] and the Ord report[18] with making easy the diagnosis of myxedema proper (adult myxedema, as distinguished from cretinism and cachexia strumipriva). He noted the early use of thyroid gland transplants by Victor Horsley[10] and the subcutaneous injection of an extract prepared first by Horsley's pupil, Murray.[17] A little later, Hector Mackenzie[14] of London and Howitz[11] in Copenhagen started the method of feeding thyroid substance. In Osler's opinion it was well to begin with the powdered gland, one to three grains (0.06 to 0.2 gm.) and gradually increase to ten or fifteen grains (0.6 to 1.0 gm.) daily. "The results," he said, "as a rule are most outstanding—unparalleled by anything in the whole range of curative measures. Within six weeks, a poor, feebleminded, toad-like caricature of humanity may be restored to mental and body health."

In addition to the clinical types described by Osler, we now recognize juvenile myxedema and hypothyroidism of a degree insufficient to produce myxedematous changes, but associated with other phenomena, in particular delayed skeletal maturation, demonstrably improved by thyroid medication.[36]

Hypothyroidism secondary to hypopituitarism is also a well established entity that more often than not is not of myxedematous degree.[16,24] A low content of protein-bound iodine (PBI) and a low uptake of I^{131} with significant increase of the uptake of I^{131} and output of PBI^{131} following injection of thyrotropin establish the diagnosis.[21] Monotropic deficiency has also been described.[25]

While even before the use of present day procedures it was readily accepted that these nonmyxe-

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dematous forms of hypothyroidism existed, the existence of a common form that the authors and other investigators believe most often represents a state between myxedema and euthyroidism, and which has been defined as "the state of the tissues produced by the presence of less thyroxin than the homeostatic mechanism demands,"[27] has not been generally credited. This form is less easily demonstrable because of dependence on the basal metabolic rate, the cholesterol level and the therapeutic trial as the bases of diagnosis even in this more enlightened day; because of failure to use adequate dosage in therapeutic trials and, finally, because of the weight of tradition, leading textbooks,[4,15,26,37] even to this day, describe only myxedema as it was described by Gull, Ord and Osler more than fifty years ago. They deny or do not mention hypothyroidism. "History may not repeat itself, but the writers of textbooks do and their reiteration, be it true or false, strengthens our beliefs."[2] The feeling of some authorities is that a serum protein-bound iodine of less than 3.5 or 4.0 micrograms per cent 100 cc. (depending on their line of division) may occur in health. The implication is that uncomplaining people are healthy, especially if they have other (indirect) evidence of normal thyroid function, such as the unreliable basal metabolic rate, the nonspecific serum cholesterol or the easily influenced uptake of I^{131}.

We insist that protein-bound iodine below 4 micrograms per 100 cc. of serum indicates a diseased condition that should be treated. Very few exceptions, based on most unusual biochemical mechanisms, occur. These exceptions will be discussed later. One wonders how many uncomplaining obese middle-aged women with fasting blood sugar content of 200 mg. per 100 cc. would be considered healthy, or whether a young woman with hemoglobin content of 10 gm. per 100 cc. of blood would be permitted to go untreated unless she complained of feeling ill. Werner included an extensive description of the changes in myxedema[35] and admonished the reader that lesser grades of the disorder exist.

It has been shown that in usual circumstances the circulating hormone is thyroxin[33] bound chiefly to a globulin (TBG) in the interalpha region in electrophoresis.[7,8] In our experience facilities for determining the serum protein-bound iodine (PBI) content are generally available in California. The test is highly specific and is a reproducible means of directly ascertaining the amount of circulating thyroid hormone.[28,29,34] Before obtaining the specimen of blood or before interpreting the result, certain precautions must be taken, as indeed must be done in the case of many laboratory procedures used in everyday practice. It must be remembed that the iodinated substances used in such roentgenographic studies as bronchograms, myelograms and sinus tract visualization will interfere with determination of PBI for an interminable period of time; the substances used for gallbladder studies and those used for intravenous pyelograms will make the test unreliable for many months or years and for several weeks, respectively. The external application of iodine, the use of iodinated gargles, swabs, toothpaste or suppositories, the ingestion of kelp, mineral-vitamin combinations, potassium iodide, Lugol's solution, expectorants and various other iodinated medicines will also invalidate the test. Use of such substances should be discontinued for three or four weeks before a specimen of blood is drawn. The normal diet, even though it includes seafood and iodinized salt, does not interfere. Administration of a mercurial diuretic causes an artificially low value for 24 to 48 hours when the distillation method is used. Mercury does not obscure the result of the alkaline ash method devised by Barker[1] and modified by Ware.[27] Our laboratory uses the latter procedure with such checks and controls as are necessary to insure reliability.

THE SERUM PROTEIN-BOUND IODINE OF MEN IN INDUSTRY

Through the cooperation of the medical departments of various industries in Southern California and the Hyland Laboratories Blood Bank, 10 cc. specimens of clotted blood drawn at the time of routine examinations were mailed to our laboratory, just as they can be mailed from any remote area to a central laboratory. We have so far determined the protein-bound iodine in duplicate in 2,807 specimens of blood thus obtained. Six hundred and ten of these specimens were drawn at the time of a routine annual physical examination of men who were working in an executive or supervisory capacity —the "white collar group." Most of the men were from 40 to 50 years of age. The results are graphically shown in Chart 1. Delimitation of the normal range of the PBI is not yet finally settled, but the most generally accepted dividing line between euthyroidism and hypothyroidism is 4.0 mcgm. per 100 cc.[3] It had been established that the serum protein-bound iodine does not change with age.[30] There were 340 specimens of the total of 2,807 that contained less than this amount; and in 52 of these the specimens were from the executive group of 610. The incidence of what may be unsuspected or inadequately treated hypothyroidism in men was, then, about 12 per cent for the entire group and 8.5 per cent for the "white collar" group. As to the higher incidence in the blood bank group—all supposedly healthy, not anemic persons, without systemic infection or gross disease—the explanation is not evident and the disparity warrants exhaustive study.

We are at present conducting further studies of

these men aimed at demonstrating the presence or absence of hypothyroidism.

The first such study has been to do a repeat PBI and cholesterol determination on those executives who, on routine screening, were found to have PBI less than 4.0 mcgm. per 100 cc. This was done in 38 instances and the finding was confirmed in 30. Of the eight repeat specimens that were reported normal, four were thought to have become normal because of treatment or more diligent use of previously prescribed thyroid extract. Hence a correct indication of the serum PBI was obtained by the first specimen in 34 of these 38 cases. Twenty-four of the men have had a complete survey that included a history, physical examination, examination of the blood, urinalysis, an electrocardiogram, determination of blood sedimentation rate, of basal metabolic rate, 24-hour uptake of I^{131} and cholesterol content, and, in 12 cases, phospholipid and lipoprotein determinations. The four cases in which the repeat PBI was inexplicably normal are included. The results are summarized in Table 1.

In this selected group it is no surprise that the history was of positive value in only one instance of thyroidectomy. Multiple complaints were admitted, but only that of tiredness or lack of energy was a general one. Fourteen men were overweight at the time of the interview; five others had dieted successfully. Except for a palpable thyroid gland in three cases, there were no helpful physical findings noted. A summary of disorders in which hypothyroidism should be suspected has been published.[31]

Six of the 24 men had previously been diagnosed as hypothyroid. Only three of the six had been taking thyroid extract regularly, and in only two instances was the amount being increased periodically as indicated by serial determinations of PBI. Two were taking a small amount of thyroid extract intermittently. One (Case T, Table 1) had had adequate management some years ago but "friends" advised

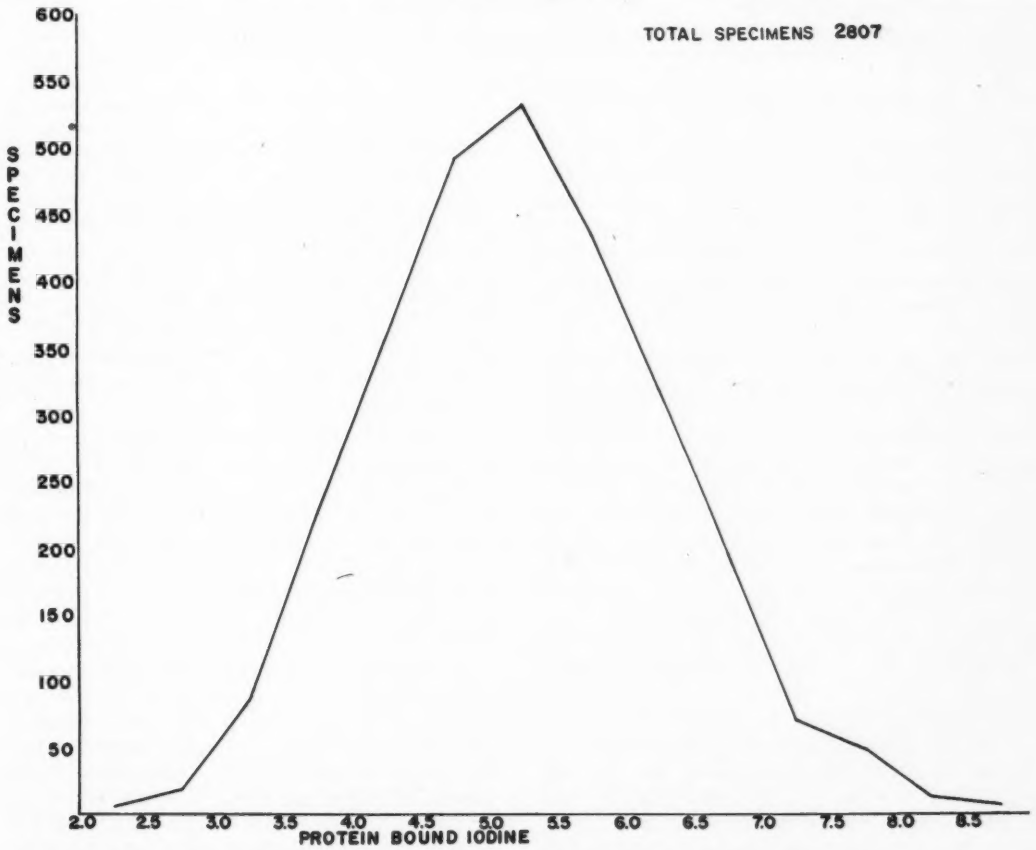

Chart 1.—Arithmetic distribution curve of serum protein-bound iodine values in 2,807 men from about 40 to 60 years of age. The vertical column shows the number of specimens of blood; the horizontal line the content of protein-bound iodine per 100 cc. of serum. The normal range is usually regarded as from 4.0 to 8.0 micrograms per 100 cc. (See Werner, The Thyroid, p. 139, Hoeber-Harper 1955).

TABLE 1.—*Summary of Survey Findings (Twenty-four of Fifty-two Men in the "White Collar" Group)*

Case	Class*	First PBI	Second PBI	BMR	Cholesterol (mg. per 100 cc.)	I^{131} Uptake (Per Cent)	Age (Years)	Comment
A†	II	3.5	3.7	....	190	10.9	23	
B	III	3.0	3.7	— 4	295	12.7	44	
C	IV	3.5	4.5‡	—14	450	1.3‡	56	Taking 0.2 mg. sodium L-thyroxine daily
D	IV	3.7	3.8-4.3	—20	290	14.8	59	Previous thyroidectomy
E	I	3.4	4.5-4.4	— 6	240	15.4	36	
F	IV	3.3	3.9-4.4	—27	230	8.7	48	
G	IV	3.3	3.5-3.9	—12	275	15.1	55	
H	III	3.5	3.5-3.8	+ 4	330	24.1	50	
I	III	2.9	3.4-3.7	— 4	210	2.9‡	55	Taking 0.12 gm. thyroid daily
J	IV	3.6	3.9-3.9	—15	300	6.0	33	
K	IV	3.6	3.5-3.6	—12	270	1.1‡	43	Taking 0.16 gm. thyroid daily
L	IV	3.8	4.2‡	+ 1	350	8.6	43	Taking 0.06 gm. thyroid daily
M	III	3.7	4.0	—11	255	12.7	49	
N	III	3.6	4.1	— 1	350	15.1	57	
O	II	3.6	4.0-4.2	—22	260	17.3	39	Hypometabolism?
P	IV	3.7	5.5‡-5.5‡	—14	310	16.0	41	
Q	II	3.6	3.8-3.8	+ 1	260	19.2	35	
R	II	3.6	4.5-4.7	—20	330	23.2	55	Hypometabolism
S	IV	3.9	4.0-4.2	—17	335	14.7	41	
T	III	2.6	3.3-3.5	— 9	350	13.6	52	Previous treatment
U	IV	3.4	4.4‡-4.6‡	+ 1	310	8.5‡	56	Taking 0.2 gm. thyroid daily
V	II	3.9	4.4-4.6	+ 4	285	18.5	45	
W	III	3.8	3.9-4.0	—14	220	25.6	36	
X	III	3.9	3.9-4.1	+ 7	292	12.4	57	

*Class I, euthyroid; II, probably euthyroid; III, probably hypothyroid; IV, hypothyroid.
†Included because of previous diagnosis of hypothyroidism on basis of low PBI.
‡Effect of treatment.
PBI = Protein-bound iodine, in micrograms per 100 cc. BMR = Basal metabolic rate.

him to stop taking so large a quantity of medicine; later on he had a series of 24-hour I^{131} uptake studies and the results were said to be within normal limits; on this basis and without benefit of such venerated procedures as the determination of basal metabolic rate and cholesterol content, let alone PBI, this man was not taking much-needed thyroid medication.

At this point it should be emphasized that the uptake of I^{131} measures just the ability of the thyroid to accumulate iodine, not its ability to produce or discharge hormone. Of ten men in the present group who were adjudged definitely hypothyroid (Class IV) by virtue of three agreeing tests, four had a low normal uptake of I^{131} (over 10 per cent and under 16 per cent); and of the six with an uptake of less than 10 per cent, four were taking thyroid extract, which might well have suppressed the uptake. In the group considered probably hypothyroid, only one had uptake below 10 per cent, and this person (Case I, Table 1) was taking thyroid extract.

The basal metabolic rate was less than minus 10 per cent in 12 of these subjects, eight of whom were considered as definitely hypothyroid, two probably hypothyroid and two probably euthyroid. In eight of 12 instances when the PBI was 3.5 mcgm. per 100 cc. or below on at least one occasion, the basal metabolic rate was in the normal range. Four of these subjects were considered probably hypothyroid, although they would be definitely considered hypothyroid on the basis of the PBI alone, even with ultraconservative standards. Two men had to be placed in the probable euthyroid group because results of all tests except the PBI were within normal limits. The sources of error in the basal metabolic rate, both inherent and technical, are well discussed by Werner[35] and have repeatedly been emphasized by Starr,[27] whose most interesting observation has been the production of a normal basal metabolic rate in a totally athyreotic myxedematous person, presumably brought about by nervous influences.

An elevated blood cholesterol has long been considered to be of value in the diagnosis of hypothyroidism,[6,12] although Peters and Man[20] were careful to point out that it is even less specific than the basal metabolic rate. A recent study of serum lipids by Jones and co-workers[13] showed that the increase in serum lipids in hypothyroidism is in no way different from that so commonly seen in the metabolic disorders related to overeating and atherosclerosis.

In instances in which there was a sufficient specimen available, we did a cholesterol determination (Chart 2). A control group was taken at random (when there was a sufficient sample available) from the men whose PBI was in the high euthyroid range (6.0 to 8.0 mcgm. per 100 cc.). In the latter group of 138 men, there were 48 men with cholesterol content above 275 mg. per 100 cc. and six with a content below 200 mg. per 100 cc. Of 140 specimens from the group with low PBI, 39 contained more than 275 mg. of cholesterol per 100 cc., but it was some-

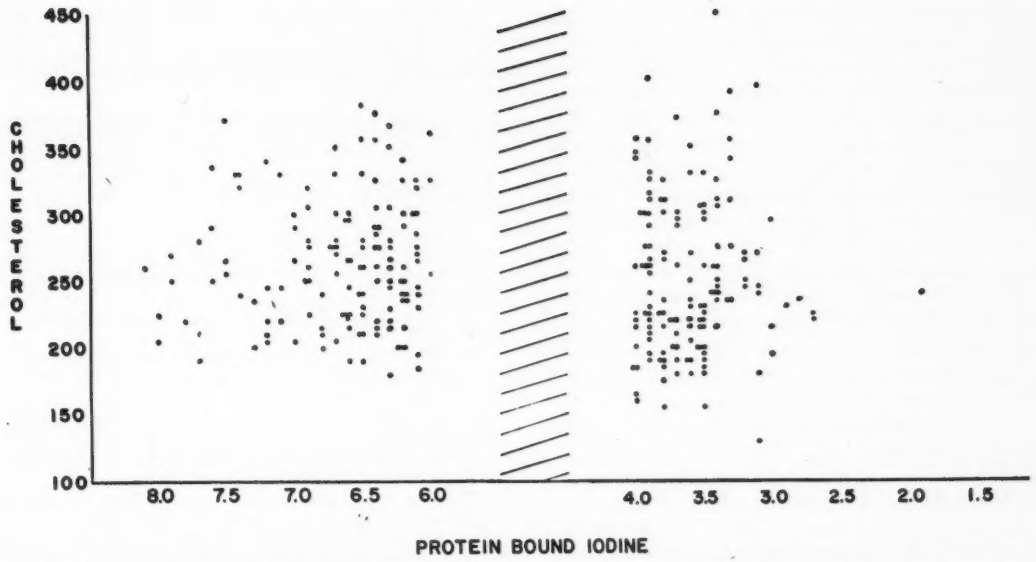

Chart 2.—Serum cholesterol (mg. per 100 cc.) in 138 men with serum protein-bound iodine above 6 micrograms per 100 cc. compared with serum cholesterol of 140 men with serum protein-bound iodine below 4 micrograms per 100 cc.

what surprising to note that 25 had cholesterol below 200 mg. per 100 cc. We have no data as regards the presence of pituitary disease and no additional data regarding thyroid status in this group.

In the selected group of 24 men (Table 1), there was only one with cholesterol under 200 mg. per 100 cc. He was the youngest, leanest man in the group (Case A). In eight other persons considered normal, the range was from 210 to 275 mg. per 100 cc. These included four of the six considered euthyroid or probably euthyroid. Fifteen were found to have cholesterol content above 275 mg. per 100 cc.

The lipoprotein and phospholipid studies provided no data different from that previously reported.[13,20] When total cholesterol is high, phospholipids are also high. The beta lipoproteins ranged from 77 to 91 per cent in 11 of the 12 determinations.

The only electrocardiographic abnormalities were bradycardia and occasional QT prolongation. The hemoglobin and sedimentation rate were within normal limits in all cases.

CLINICAL EVIDENCE OF HYPOTHYROIDISM

On appraisal of these laboratory tests, physical examinations and interviews in 24 men from the 52 in the "white collar" group with low PBI, 18 (75 per cent) were either probably or definitely hypothyroid. They were called probably hypothyroid (Class III) when the repeat PBI was low and the result of one of the other tests was strongly suggestive; they were called definitely hypothyroid (Class IV) when the repeat PBI was low and results of two other tests were highly suggestive. Four of the six adjudged euthyroid were so designated because a repeat PBI was within normal limits; the remaining two had low PBI on repeat test, but no other tests were suggestive of hypothyroidism. Most of these cases (and others as they are detected) will be re-evaluated periodically.

If three quarters of the men with serum protein-bound iodine values of 4.0 micrograms or less per 100 cc. have clinical hypothyroidism, as this study would indicate, the total of American men in the middle-age group with this important deficiency exceeds one million.

Because of individual variation in homeostasis there is no consistent clinical picture in hypothyroidism. The conditions that influence individual response are multiple and subtle. A feeling of well-being may be produced because such adjustments obscure the lack of thyroxin, or vague illness may develop.

Epinephrine, in the presence of small amounts of thyroxin, but not in its total absence,[32] can be a potent synergist of its action. It is possible that it can compensate for thyroxin deficiency.

The effect of the 11-oxygenated adrenal steroids on intermediary metabolism are well documented. Much of their effect is such as to mask thyroxin deficiency. They are particularly capable of restoring normal oxygen consumption even in the absence of thyroxin and of potentiating the effect of small amounts of thyroxin.[5]

It is possible that certain persons have a reduced binding capacity (low thyroxin-binding globulin)

in the serum or an accelerated rate of unbinding, so that a sufficient amount of free thyroxin is available to pass through the capillary walls. It is equally possible that there may be a reduced binding capacity in the extracellular fluid, making sufficient free thyroxin available. In nephrosis where binding capacity may be low, the PBI can be low[22] and yet the needs of the cells are met presumably because the necessary amount of free hormone is available. In normal pregnancy where there is a high thyroxin-binding globulin (TBG) and a high binding capacity,[23] a high PBI, even one of 12 micrograms per 100 cc., is not associated with hyperthyroidism; a PBI of 5.0 micrograms per 100 cc. is regarded as inadequate in pregnancy. There is as yet no demonstration of diminished TBG or increased binding capacity associated with hypothyroidism. Studies of this factor are in progress.

Still another possible explanation is that an enhanced enzymatic conversion of thyroxin to some other metabolically active substance may explain the presence of the normal PBI in these cases.

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Acute Gallbladder Disease

Experiences with 103 Consecutive Cases

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• **One hundred and three cases of acute cholecystitis in patients ranging in age from 19 to 88 years were reviewed. Operation was done in all cases. Seventy per cent of the patients were women.**

Primary cholecystectomy was done in 72.8 per cent of the series. Primary cholecystostomy was performed in the remainder, and one-fourth of these patients had a secondary cholecystectomy. No specific time, with relation to interval after onset of symptoms, was chosen for operation.

Jaundice was present in 14.5 per cent of patients at the time of admittance to hospital. Serum amylase was above normal in five of 27 patients on whom this determination was carried out. All five were women.

The gallbladder was perforated in 13 cases. Common duct exploration was done in 25 cases and in 12 of them stones were found.

The morbidity rate for the series was 11.6 per cent; the mortality rate 9.7 per cent.

THE MOST FREQUENT INDICATION for abdominal operation after the age of sixty is disease of the biliary tract. The acute form of the disease in this older age group is associated with a distressingly high mortality rate. The gradual increase in the average age of our population has brought this problem more acutely into focus in the recent years. In the younger age groups the disease is predominantly one of females, but as aging progresses the proportion of males increases until at about 65 cholecystitis occurs with equal frequency in both sexes. Crump[3] observed that the incidence of stones also increases with age; half of all persons at the age of 70 have cholelithiasis. Among physicians dealing with this problem the conviction is growing that at the first signs of trouble a cholecystectomy should be performed before age and the inevitable progression of the disease lead to an operation of necessity on an infirm and debilitated patient. The mortality rate for elective operation before the age of 60 is less than 1 per cent; for the acute form of the disease after the age of 65 it is more than 10 per cent.

A great deal has been written relative to the proper time for surgical intervention in the acute form of the disease. Yet statistically there is little difference in mortality rate as between immediate and delayed operation. Advocates of immediate operation believe that the danger of rupture of the gallbladder or the chance of spreading infection outweighs the risk of operating on a seriously ill patient. Observers who believe delay of operation is better feel that there is less risk of damage to vital structures and of complications when operation is performed after the subsidence of the acute phase of the disease without the complicating factors of obscuring edema and inflammatory exudate. Almost all investigators agree that operation should be done if a patient does not improve under conservative management. Most observers stress that the time of operative intervention should be governed by factors in the individual case and none advocates that operation is so urgent that balancing electrolytes can be neglected. A wise surgeon's choice is also influenced by competence of the available assistance and anesthesia.

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The 103 patients with acute cholecystitis whose cases are here presented for analysis entered the Stanford University Service of the San Francisco Hospital in the ten years 1945-1955 with acute abdominal pain and were observed because of diagnostic problems. Many of the patients had had previous attacks and might be considered as having an acute episode in the course of chronic cholecystitis. There were 85 white and 18 nonwhite patients, a race distribution approximately proportionate to the race distribution of all patients admitted to the hospital. The age range was from 19 to 88 years, with roughly one half of the patients less than 60 years of age. Seventy per cent of the total were women. There was one man and 22 women under 40 years of age. After the age of 40 the ratio was approximately two women to one man. Of the 73 women, 29 had had no pregnancies. Age and sex data by decades was as follows:

Age (Years)	Female	Male
0 to 20	1	0
20 to 29	16	0
30 to 39	5	1
40 to 49	12	5
50 to 59	7	8
60 to 69	15	5
70 to 79	11	8
80 to 89	6	3

Seventy-five of the patients had primary cholecystectomy. Twenty-eight had primary cholecystostomy and seven of the 28 had cholecystectomy. The remaining 21 were not subjected to a cholecystectomy because of the following reasons: Eight died postoperatively, five were lost to follow-up and three were treated without operation because of lack of symptoms. In five it was felt unwise to operate because of advanced age and/or other associated disease.

Interval Between Onset and Operation

In general our policy is to operate when the acute phase is subsiding. After gastric suction and antibiotic therapy are begun, an effort is made to correct electrolyte imbalance. Surgical intervention is undertaken promptly if the patient's condition deteriorates or does not improve under conservative management. If improvement continues, we operate when the symptoms have subsided. In certain cases in which the patient's condition was deemed excellent, cholecystectomy was done in the acute phase without further observation. We have not hesitated to operate in the face of the increased bacteriological growth in the gallbladder reported to occur from the fourth to tenth day after the onset of cholecystitis. We have found inflammatory edema which often persists for two to three weeks or longer not to be a serious obstacle. In a few patients it was noted that cholecystectomy would have been technically easier in the absence of inflammatory reaction, but the operation was completed without incident in each of these cases. In one patient who was operated on in the second week after the onset of acute cholecystitis, laceration of the common duct occurred and was noticed and repaired. No patient in the series returned with common duct stricture.

The time between onset of symptoms and operation was as follows:

Days of Symptoms	Number of Cholecystectomies	Number of Cholecystostomies	Total Operations
1	5	3	8
2	6	3	9
3 to 4	5	11	16
5 to 7	12	5	17
8 to 14	18	3	21
15 to 21	17	3	20
22 to 42	5	0	5
Over 42	7	0	7
Total	75	28	103

Eighty (78 per cent) of the patients were observed at operation to have stones in the gallbladder.

Fifteen patients were jaundiced on admission. Choledochotomy was performed in each instance. In one case, owing to the critical condition of the patient, drainage of the common duct was carried out without exploration of the duct. In ten of the remaining 14 cases stones were observed in the common duct at operation. In one patient jaundice developed a month following cholecystectomy which had been preceded by cholecystostomy. Upon reoperation a stone was recovered from the common duct.

Serum Amylase

Twenty-seven patients had serum amylase determinations. In our laboratory, over 200 units per 100 cc. is considered abnormal. Five of the 27, all women, had amylase content above that level. Brief descriptions of the cases follow:

1. Age 24 years; amylase 280 units; history of jaundice; dilated cystic duct; two small stones recovered from the common duct; pancreas normal.

2. Age 45 years; amylase 410 units; jaundiced; common duct and cystic duct slightly dilated; stones in gallbladder; no stones found in common duct; pancreas normal.

3. Age 23 years; amylase 790 units; jaundiced; numerous small stones in common duct; pancreas normal.

4. Age 69 years; amylase 1,100 units; jaundiced; no stones found in common duct; pancreas normal.

5. Age 26 years; amylase 1,810 units; jaundiced; gallbladder contained many stones; no stones found on exploration of slightly dilated common duct; pancreas normal.

It is interesting that in these five cases in which pancreatitis was suggested by an elevated serum amylase the pancreas appeared normal at the time of operation.

Perforations

Perforation of the gallbladder was noted in 13 cases. In three cases the perforation was into the free abdominal cavity, and profuse hemorrhage occurred in one of these three. In ten cases the area of perforation was walled off and peritonitis was localized. The walled off perforation was into the liver bed in two cases and in a third it was associated with a primary carcinoma of the gallbladder, the only carcinoma in the series. There were three deaths in the group in which perforation had taken place.

Exploration of the Common Duct

Twenty-five, or roughly one-fourth, of the patients were subjected to exploration of the common duct, and stones were found there in 12 cases. The indications for exploration and the incidence of them in the 25 cases were as follows: Jaundice or history of jaundice in 17 cases; dilated common duct, 12 cases; small stones in gallbladder, 10 cases; abnor-

TABLE 1.—*Data on Ten Cases In Which Patient Died*

Age	No. of Patients	Operation	Cause and Time of Death	Days from Onset of Symptoms to Operation
40-49	1	Cholecystostomy	Aspiration and death at operation	2
60-69	1	Cholecystectomy	Anuria; second postoperative day	7
70-79	3	Cholecystostomy	Peritonitis; first day	3
		Cholecystostomy	Coronary occlusion; second postoperative day	2
		Cholecystectomy	Pneumonia; fourth postoperative day	3
80-89	5	Cholecystostomy	Coronary occlusion; fourteenth postoperative day	3
		Cholecystostomy	Pulmonary embolism	1
		Cholecystostomy	Inanition; two months postoperatively	21
		Cholecystostomy	Pneumonia; fourth postoperative day	3
		Cholecystostomy	Cerebrovascular accident; sixth postoperative day	10

malities to palpation, 8 cases; pancreatitis (as indicated by elevated serum amylase), 5 cases.

X-ray Studies

Scout films of the abdomen were taken in 39 cases. In 27 of them no abnormalities were observed, in 12 radiopaque stones were visualized, and two showed a mass in the region of the gallbladder. Oral cholecystograms were done in 33 cases after subsidence of symptoms. Twenty-eight showed nonfunction of the gallbladder. At operation 22 of the patients in the nonfunctioning group had stones and six did not. Three of the total group showed poor function with radiolucent stones and two had normal function with nonopaque stones. Cholangiograms were done in six cases following cholecystostomy, and in three of them stones were demonstrated. T-tube or catheter drainage was provided in all but one of the cases in which common duct exploration was done. Cholangiograms were done by introducing the dye through the tubes usually on about the tenth to fourteenth postoperative day. If no obstruction was demonstrated, the tube was clamped for a day or two and then removed. Operative cholangiograms were not made in any case.

Morbidity

Postoperative complications occurred in 12 cases. There seemed to be no relationship between the time interval from the onset of symptoms and operation to the number or gravity of complications. Complications that occurred in two cases each were wound dehiscence, subphrenic abscess and superficial wound infection, and complications in one case each were abdominal abscess, postoperative fever of undetermined cause, thrombophlebitis, cholangitis and pancreatitis, laceration of common duct (immediately repaired) and shock, the operation having been stopped in this case and completed four days later.

Mortality

There were ten deaths, eight of which occurred following cholecystostomy in seriously ill patients. Only two of the patients who died were less than 70 years of age. Data on the cases in which death occurred are given in Table 1.

DISCUSSION

In spite of the fact that there is little difference in mortality and morbidity shown between early and late intervention, we believe that if treatment is determined on the basis of circumstances in each case, an improvement in results can be obtained. Our series does not show significant difference from other series with regard to morbidity and mortality, and it occurs to us that perhaps if the proponents of immediate operation and those who advocate postponement were to state their exceptions, it would turn out that their policies were tantamount to ours. In this day of antibiotics, whether to operate early or late must be dictated by the surgeon's ability to judge the changing clinical signs and symptoms. No surgeon wishes to operate on a seriously ill patient if he feels that the chances are that with delay he can approach the same problem under greatly improved conditions. On the other hand, no surgeon would deny a moribund patient a chance to live.

We have not found that the fourth to the tenth day is a critically unfavorable period for surgical intervention, nor do we feel that it is necessary to continue conservative treatment for two to three weeks if acute signs and symptoms have receded.

Seven of the patients who died were operated on within three days of the onset of the attack, and all with the exception of one had cholecystostomy because of the gravity of their condition. Two additional deaths occurred following cholecystostomy ten days and three weeks after onset of symptoms. In those cases operation was done because of progression of symptoms. One-third of the patients in the present series were operated upon between the fourth and fourteenth day. Of these only one, a woman in her sixties, died. The cause of death was anuria.

Exploration of the common duct was undertaken in approximately 25 per cent of the patients, which

is about the same proportion as reported in most other series. Recently there has been a tendency to explore the duct in more cases. Stones were found in 46 per cent of the cases in which exploration was done. Ten of the 12 patients with common duct stones had jaundice. In four patients with jaundice no stones were found on exploration of the common duct.

It is interesting that all five patients with elevated amylase were women and at the time of operation no evidence of pancreatitis was found. It is known, of course, that there are conditions other than pancreatitis that will cause an increase in serum amylase.

We feel that more critical thought should be given to the proposition that asymptomatic cholelithiasis is an indication for operation without reference to age. Crump[3] observed that in 1,000 autopsies cholelithiasis was present in 25 per cent of subjects more than 40 years of age and in 50 per cent of those past 70 years. There are 11,250,000 people in this country over 65 years of age. Applying Crump's autopsy data would indicate the incidence of stones in this age group around 35 per cent. Assuming that over 10 per cent of these have already had cholecystectomy (which is certainly a high figure), there would then be in this age group 3,500,000 persons for whom cholecystectomy would be indicated. If the operative mortality were 3 per cent, as Glenn and Hays[7] reported it to be in patients over 65 years of age having cholecystectomy, there would be 105,000 operative deaths, not to mention morbidity. United States government statistics show 3.4 per cent of deaths in this age group are from gallbladder disease. Certainly a goodly number of those who died must have had symptoms before their final illness. It would seem that some consideration of the severity of symptoms should be required, as well as general assessment of the patient's condition, as prerequisites to any recommendation of a general operative program for removal of stones in all age groups; but because of the seriousness and frequency of cholecystopathy in aged persons, we feel that prophylactic removal of asymptomatic stones is indicated in the younger age groups in which surgical mortality associated with the operation is very low.

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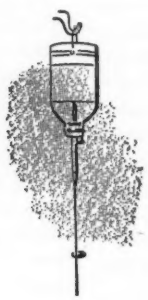

Forensic Skiagraphy

L. HENRY GARLAND, *M.B.*, San Francisco

• **Since roentgenograms are merely skiagraphs and not photographs, and since they are accordingly subject to erroneous interpretations or deductions, it would seem highly desirable that courts rely upon expert analysis of them, rather than demonstration of the negatives themselves. Such practice is customary in connection with clinical laboratory work, pathology, bacteriology and many other medical fields.**

Interpretations of skiagraphs should be clear, complete and consistent.

THE LATE Judge George H. Buck of San Mateo County would not allow the introduction of roentgenograms into his court. He believed that they were not intelligible to the average juror, and that jurors could better be informed by hearing or reading the expert interpretation of the films made by persons qualified to do so. The good judge was far ahead of his time.

The ostensible purpose of presenting roentgenograms in court is to inform members of the jury, so that they may be able to draw conclusions from objective data. The actual purpose would often appear to be to impress them and sway their emotions. To the average laymen an x-ray is a "photo" and is commonly referred to as a picture or photograph. To him, it speaks for itself. The element of correct interpretation is seldom thought of.

An x-ray film is neither a photograph nor a picture; it is a shadow-graph, or skiagraph. A photograph or picture is a representation or reflection of what the eye actually sees, and may therefore be interpreted with reasonable ability by many persons. A radiograph is a representation of shadows resulting from light's penetrating of tissues of variable density; and familiarity with skiagraphy is required for proper interpretation of it. The physical facts were set out many years ago in the Encyclopaedia Britannica: "It is well to remember that radiography is the production of a shadow picture. The shadows exist . . . because x-rays are absorbed to different degrees by different media. If we were to radiograph a perfectly homogeneous piece of muscle or steel, we should obtain a photographic plate quite uniformly blackened because the x-ray absorption would be quite uniform. The absorption of x-rays by any material depends, firstly, upon the material itself, in general the higher its atomic weight the more absorbent it is—and, secondly, upon the penetrating power or wave-length of the x-rays."[3]

In 1901 an American pioneer, Dr. Francis Williams of Boston, stated: "Radiographs should be read . . . [by one] . . . who is trained in reading them. In cases of poisoning we do not expect the jury to interpret all the tests which the chemist has made, but the latter can make the meaning of those tests clear to the jury."[6]

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The late distinguished Professor F. J. Baetjer of Johns Hopkins likewise emphasized: "There is no such thing as an x-ray picture. A roentgenogram is a projection upon a photographic plate of a series of shadows of varying density representing the various structures through which the rays have passed. The correctness of the diagnosis depends entirely upon the skill with which these various shadows are separated and interpreted. To interpret these shadows correctly one must know not only the appearance of the normal structure, but also the alterations that take place when there is a pathological process present. . . . Roentgenology is . . . a medical procedure based upon careful analysis and logical deductions from the shadows observed upon an x-ray plate, and translated into pathological terms. This means—and it cannot be too strongly emphasized—that the skill of a roentgenologist will vary directly with his medical knowledge; the value of the roentgenologist to the medical profession (and patient) will be based upon this fact and not upon his technical ability."[1]

COURT HEARINGS

Should x-ray films be shown in court? The average layman does not pretend to interpret a complex legal document; he consults or employs a lawyer to do this for him. The average lawyer does not try to interpret a complex problem in a special branch of law, such as admiralty or tax law; he consults an expert in that field. Similarly, many physicians do not try to interpret roentgenograms; they consult radiologists and seek their interpretation, combining the subsequent report with data obtained by clinical and other forms of examination. If many physicians do not attempt to interpret roentgenograms, how much less so should laymen?[2]

In my limited experience I have seen juries swayed

by gross misinterpretations of roentgenograms, the finding being dramatically "documented" by persons pointing to places on the films placed in an illuminator in the courtroom. The following are some examples:

1. A "fracture" simulated by an overlying muscle-margin shadow (notably in the case of a lumbar transverse process crossed by the edge of the psoas shadow).

2. "Silicosis" simulated by imperfect technique (chest roentgenograms made with large focal spots, or in partial expiration, or with patient motion).

3. "Pulmonary tuberculosis" simulated by local congestion, pleural thickening and other conditions.

4. Cervical spine "subluxations" and "compression fractures of lateral masses," due to slight angulation or rotation of the spine at the time of x-ray examination. (Lesions of this latter group are now frequently reported in persons alleged to have whip-lash injuries: Roentgenograms are marked with arrows, circles and lines, then displayed to an impressionable jury, often by an orthopedist-radiologist team, who readily convince the jury that dire injuries are present).

These errors could be minimized or obviated were expert reports introduced instead of roentgenograms. The experts themselves could be court appointed, if necessary. However, whether an expert's report alone, or his report and roentgenograms are introduced, the radiologist must identify himself, his specialty and his qualifications to the jury and judge. This unfortunately involves an immodest but quite essential listing of training, experience and qualifications. It involves identifying radiology as a branch of medicine. Finally, if called upon to interpret the films for or in front of the jury or judge, it involves calm appraisal of the findings and clear statement of opinion in as simple language as possible. Even after a brilliant presentation, a jury may be still a little puzzled as to the difference between a photographer and a roentgenologist, or between a radio repairman and a radiologist. Jurors need to be reminded as tactfully as possible that a radiologist *is* a physician, a doctor of medicine with three or more years of special training in the field, with limitation of practice to that field, and with better qualifications to interpret roentgenograms expertly than any other type of specialist or nonspecialist.

In many problems pertaining to the bones and the lungs, stereoscopic roentgenograms are essential for diagnosis; and since they cannot be viewed stereoscopically by twelve jurors at one time, essential points must be described rather than truly demonstrated.

It is highly desirable that radiologists and orthopedists agree on reasonably standard terminology for normal appearances, common anomalies, and common types of injury and disease. Terms such as "old" and "recent," "small" and "large," should carry qualifying phrases to indicate the precise meaning of the writer or speaker. Vertebral bodies and ribs should be numbered correctly. Osler emphasized that the practice of medicine is the practice of an art which consists largely in the balancing of probabilities. It is a science of uncertainty and an art of probability. Court hearings require a semblance of dogmatism or scientific statement which is often inconsistent with clinical truth. This point should be stressed on occasion.

SOME QUESTIONS

Your chairman* kindly listed some questions the answers to which he thought might be of interest and utility. These are as follows:

"How should the radiologist prepare a case?" Well, it seems to me that he should be eternally prepared. He is a specialist in the field. His technical work should be good and his interpretation should be skillful. His library, or that in a nearby institution, should supply refinements of information in suitable cases.

"Can you ask for additional examinations before trial?" One can ask for them, but they are often not obtainable. Furthermore, they are frequently not necessary for the problem at issue. Careful study of the available records, radiologic and otherwise, will usually permit the radiologist to testify adequately. But it is desirable that the study be deliberate, with proper viewing equipment in light-controlled rooms.

"Can you refuse to testify on films that you consider inadequate for any reason?" Well, except you are subpoenaed, I presume you can always refuse to testify on such. If you are subpoenaed, you can point out the fact that the films are technically or otherwise inadequate (with specific reasons for the opinion), and therefore the possibility of drawing valid conclusions is accordingly restricted.

"Do you attempt to show normal views or demonstrate examples of similar disease?" Depending on the degree of histrionics required in order to establish the maximum chance of justice being administered, I suppose that normal views or other projections might be brought to court and an attempt made to introduce them. It has not been customary in my limited experience.

"Do you accept magnafilms or minifilms as legitimate examinations?" Certainly. In selected cases magnified-image views may be of value; and in other

*Of the joint session of the Sections on Orthopedics and Radiology at the 86th Annual Session of the California Medical Association.

cases minifilms, properly identified, may be shown both in standard size and by means of "blow-ups." It appears to be the consensus of scientific radiologic and orthopedic thought that magnified-image films seldom disclose bone lesions not visible in properly made orthodox films. Examination of the latter with a two-power hand lens will usually provide *all* of the information obtained by magnified-image views, with much less radiation exposure to the patient, and with less risk of fuzzy or distorted shadows which can lead to erroneous interpretations.[4,5]

"Are you allowed any opportunity to discuss the case with other consultants before the trial?" Yes.

"Are you required to use the equipment made available in court, or can you bring some of your own?" It is my understanding that you can bring some of your own if you desire; however, it is my impression that the use of the ordinary viewbox available in court (aided perhaps by a blackboard sketch) is just as likely to result in a convincing demonstration as is the use of special equipment.

"How do you keep from lingual trespass when the law requires you to speak?" I should imagine the answer to this is that you should keep your feet firmly under the chair, and your tongue retracted and moved the minimum amount required for clarity of expression.

"When can you refuse to answer with a categorical yes or no?" You can refuse to answer with a categorical "yes" or "no" when the latter would result in an untruthful or misleading answer. One can always turn to the judge and request permission to qualify one's answer in order to render a clear and truthful reply.

"What factors determine the fee?" Well, they are many. The primary factor is justice to all concerned. If you are away from your office or hospital department for four hours, and you have thereby lost consultations which amounted to perhaps a hundred dollars in fees, you are certainly entitled to that sum plus necessary traveling expenses. If the loss has been greater or less, your fee could be reasonably greater or less. On the other hand, if you are testifying on behalf of a colleague in a case of alleged malpractice, it is customary to charge no fee. We are informed that some physicians appear in court on a contingency basis, such as 10 per cent of the settlement. The ethics of this would appear to be open to question.

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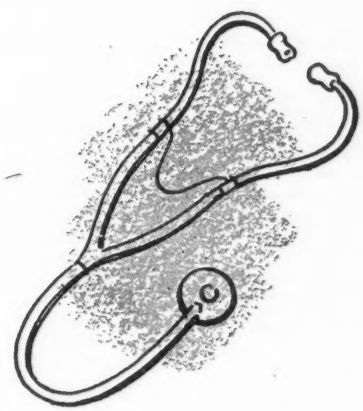

Electromyographic Examination in the Office

JAMES G. GOLSETH, *M.D.*, Pasadena

• **During a recent 12-month period, a total of 560 patients were referred for electromyographic examinations. They were sent by orthopedic surgeons, neurosurgeons, internists, general practitioners, neuropsychiatrists and practitioners of physical medicine. Orthopedic surgeons referred more than any other specialists.**

Results of examination of patients referred because of suspicion of root compression were much more often negative than positive. Results were positive for the disease in all cases in which referral was because of suspicion of lower motor neuron disease, primary muscle disorders and upper motor neuron disease.

Short electromyographic reports that concentrate on interpreting the electromyographic data were found to be preferred by the referring physicians.

DURING THE PAST SEVERAL YEARS, electromyographic examinations have been requested more and more frequently by physicians in several specialties in the area about Los Angeles. It becomes pertinent, therefore, to turn attention to what specialists make the most use of electromyography, to the kinds of neurological lesions that cause them to refer patients most frequently, and to satisfactory methods of communicating electromyographic data to a referring physician.

All the patients discussed in this paper were examined in my private office during a recent period of 12 months. This point is mentioned because it appears likely that the results might be somewhat different if hospital patients were included. The recordings were made by inserting one insulated monopolar needle electrode into each of the various muscles examined. All examinations were done with the Meditron Electrograph Model 201 A.

For reasons that will become apparent later, data on patients having suspected root compression and peripheral nerve lesions are dealt with separately in this study rather than included under the broad category of lower motor neuron disease. It should further be pointed out that patients having suspected plexus lesions were included with the group having suspected peripheral nerve injuries. The category *lower motor neuron disease* in this study includes patients having either residual poliomyelitis or progressive spinal muscular atrophy, whereas the category *primary muscles disorders* includes patients having either myotonia or progressive muscular dystrophy.

The muscles most frequently examined electromyographically and the peripheral and segmental motor supply of each are shown in Table 1. These muscles are readily accessible for examination and their peripheral and segmental motor supply is quite accurately known. In addition, the electromyographic data obtained from the examination of these muscles enables one to express a satisfactory opinion concerning the various types of neurological lesions most frequently seen in the practice of the specialists who referred the patients for examination.

A total of 560 electromyographic examinations were done during the 12 months of this study. The

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TABLE 1.—*Muscles Frequently Examined Electrographically*

ANTERIOR DIVISION MUSCLES

Upper Extremity	Peripheral Nerve	Root Supply Major	Root Supply Minor
Deltoid	Axillary	C-5	C-4, 6
Biceps	Musculocutaneous	C-6	C-5
Triceps	Radial	C-7	C-6
Brachioradialis	Radial	C-5	C-6
Flex. carpi radialis	Median	C-7	C-6, 8
Flex. carpi ulnaris	Ulnar	C-7	C-6
Abd. pollicis long	Radial	C-8	C-7
Opponens pollicis	Median	C-8	C-7
First dorsal interos.	Ulnar	C-8	C-7
Abd. digiti quinti	Ulnar	T-1	C-8

Lower Extremity	Peripheral Nerve	Root Supply Major	Root Supply Minor
Iliopsoas	Femoral	L-2	L-1, 3
Adductor longus	Obturator	L-3	L-2, 3
Vastus lateralis	Femoral	L-4	L-2, 3
Tibialis anterior	Peroneal	L-4	L-5
Ext. hallucis long	Peroneal	L-5	L-4
Peroneus longus	Peroneal	L-5	S-1
Gastrocnemius:			
Lateral head	Tibial	S-1	L-5, S-2
Medial head	Tibial	S-2	S-1
Lateral hamstring	Tibial	S-1	L-5, S-2
Medial hamstring	Tibial	L-5	L-4, S-1

POSTERIOR DIVISION MUSCLES

Neck		
Semi spinalis capitis	C-1 to	C-6
Semi spinalis cervicis	C-6 to	T-2
Low Back		
Multifidus	L-1 to	S-3

results were positive for lesions in 181 cases (32.4 per cent) and negative in 379 cases (67.6 per cent).

Orthopedic surgeons referred more patients than any other specialists (Table 2) and practitioners of physical medicine relatively few (but it should be noted that many of the latter do electromyography themselves).

The most frequent reason for referral for electromyographic examination (Table 3) was suspicion of root compression, a fact that does not accord with a rather general assumption that electromyography is most often used for examination of patients with suspected peripheral nerve injuries.

Results of electromyographic examination of patients suspected of having root compression syndromes were negative much more frequently than positive, whereas for all other types of lesions, results were positive far more often than negative (Table 4). Results were positive for the disease in all cases of patients referred with suspected lower motor neuron disease, primary muscle disorders and upper motor neuron disease.

TABLE 2.—*Number of Electromyographic Examinations Requested by Various Specialists*

Specialty	No. of Patients	Per Cent of Total
Orthopedic surgery	267	47.6
Neurosurgery	161	28.7
Internal medicine	45	8.1
General practice	43	7.7
Neurology and psychiatry	27	4.8
Physical medicine	17	3.1

TABLE 3.—*Number of Patients Referred with Various Suspected Lesions*

Suspected Lesion	No. of Patients	Per Cent of Total
Root compression syndrome	446	79.7
Peripheral nerve injury	98	17.4
Lower motor neuron disease	6	1.1
Primary muscle disorder	6	1.1
Upper motor neuron disease	4	0.7

TABLE 4.—*Number of Positive and Negative Results of Electromyographic Examinations of Patients with Various Suspected Lesions*

Suspected Lesion	No. of Patients	Per Cent of Total
Root compression syndrome:		
Positive	85	15.2
Negative	361	64.5
Peripheral nerve injury:		
Positive	80	14.3
Negative	18	3.1
Lower motor neuron disease:		
Positive	6	1.1
Primary muscle disorder:		
Positive	6	1.1
Upper motor neuron disease:		
Positive	4	0.7

REPORTS TO REFERRING PHYSICIANS

I used to make long reports to the referring physicians, including not only the names of the various muscles examined, but also the electromyographic abnormalities noted for each muscle. However, upon learning that referring physicians usually do not desire so much detail, a simpler form of report, summarizing the examination and the results, was adopted.

To illustrate, suppose that a patient with suspected cervical root compression syndrome is referred for electromyographic examination. Then, after taking a rather careful history, suppose that the muscles supplied by the anterior and posterior primary divisions of the fourth cervical nerve through the first thoracic roots on the left were examined and no electromyographic abnormalities were elicited. The report to the referring physician would be as follows:

John Doe
111 A Street
City B, California
Age 40
Refer: Z. A. Brown, M.D.

ELECTROMYOGRAPH REPORT 3/4/57

Electromyograms of selected muscles supplied by the anterior and posterior primary divisions of the fourth cervical root through the first thoracic root on the left revealed no denervation or fasciculation activity in any of the areas sampled. Under voluntary effort, simple motor unit waves ranging in magnitude from 100 to 1,100 microvolts were elicited from all areas. There was no spontaneous motor unit activity on passive movement, and the needle resistance was normal in all areas.

Impression: There were no diagnostic abnormalities in the electromyograms of selected muscles supplied by the anterior primary and posterior primary divisions of the fourth cervical through the first thoracic roots on the left.

Comments: At present, I am unable to demonstrate anything in the electromyograms of selected muscles supplied by the anterior and posterior primary divisions of the fourth cervical root through the first thoracic root on the left which would account for this patient's complaints. If after you complete your studies nothing further is found, I shall be glad to reevaluate him at a later date and report any changes noted.

If, on the other hand, the electromyographic examination on this patient had revealed denervation

activity in about 10 per cent of the areas sampled of the muscles supplied by the seventh cervical root, the report would be as follows:

Electromyograms of selected muscles supplied by the anterior and posterior primary divisions of the fourth cervical through the first thoracic roots on the left revealed denervation activity in about 10 per cent of the areas of the muscles supplied by the anterior and posterior primary divisions of the seventh cervical root. No fasciculation activity was elicited from any of the areas sampled. Under voluntary effort, simple motor unit waves ranging in magnitude from 100 to 1,100 microvolts were elicited from most areas. There was no spontaneous motor unit activity on passive movement, and the needle resistance was normal in all areas sampled.

Impression: The electromyographic findings are consistent with denervation activity in about 10 per cent of the areas of the muscles supplied by the anterior and posterior primary divisions of the seventh cervical root on the left.

Comments: Considering the history, the present electromyographic findings would be most consistent with a moderately severe root compression syndrome involving the seventh cervical root on the left.

1060 East Green Street, Pasadena.

For Your Patients—

A Personal Message to YOU:

As your personal physician I consider it both a privilege and a matter of duty to be available in case of an emergency. Consequently, I thought it would be a good precaution if—on this gummed paper which can be pasted in your telephone book or medicine cabinet—I listed the numbers where I can be reached at all times. They are:

_____ _____

OFFICE HOME

Sincerely,

_____, M.D.

MESSAGE NO. 2. Attractive, postcard-size leaflets printed on gummed paper, you to fill in telephone numbers and your signature. Available in any quantity, at no charge, as another service to CMA members. Please order by Message Number from CMA, PR Department, 450 Sutter, San Francisco.

Influenza Vaccine, Asian Strain

Reactions Following Its Use in Adults

JOSEPH F. SADUSK, JR., M.D., and GEORGE NESCHE, M.D., Oakland

• A study of reactions following influenza vaccine inoculation of 327 employees of Peralta Hospital, 55 men and 272 women, showed a very low value for significant or severe reactions. The reaction rate as observed with the present monovalent vaccine containing 200 CCA units of Asian strain, Type A influenza virus, was considerably lower than that reported with previous polyvalent vaccines containing up to 1,400 or 1,500 CCA units of total virus content.

The absenteeism rate was 1.1 per cent for women, nil for men.

The incidence of reactions was much greater in women than in men. Local reactions such as pain, swelling, or redness at the site of injection occurred in 29.1 per cent of men and 35.7 per cent of women. The incidence of systemic reactions —fever, aching, chilliness, headache, nausea and vomiting—was 3.6 per cent in men and 8.8 per cent in women. About 9 per cent of men and 30 per cent of women had both local and systemic reaction. Some 58 per cent of men and 25 per cent of women had no reaction.

The greater majority of reactions appeared within five hours after inoculation with influenza vaccine.

In adults the prevention of anaphylactic reactions due to the small amount of egg protein in influenza vaccine, can be accomplished by screening for history of hypersensitivity to egg, chicken or chicken feather. In questionable cases, intradermal testing can be done.

The reaction rate observed in this study for the present influenza vaccine was so low that it ought not deter immunization.

RECOGNIZING the distinct possibility of a serious outbreak of influenza in the San Francisco Bay Area during the fall of 1957, the Medical Advisory Board of Peralta Hospital, Oakland, on July 31, 1957, appointed a committee consisting of Dr. George Nesche, Dr. Joseph F. Sadusk, Jr., and Dr. Arthur Twiss to continuously survey the situation and delegated to that group authority to organize and direct an immunization program against influenza if and when appropriate. In view of the similarity existing between the present rapid spread of influenza on a worldwide basis and the situation existing in 1918, the committee put into effect on August 30, 1957, a preplanned program for inoculation of all Peralta Hospital employees with influenza vaccine, Asian strain.

Since no data is available in the literature to indicate the reaction rate to be expected from the currently used influenza vaccine, the Peralta immunization program was planned to yield specific information on this point. A report of that information is the purpose of this paper.

Reactions from influenza vaccine[7] were outlined in the 1940's and were found to be comparable to those seen with typhoid vaccine—annoying but not serious. The local reaction consisted of pain, swelling and redness at the site of inoculation; the systemic reaction was characterized by fever, headache, chilliness, generalized aching, nausea and vomiting.

While some early reports[1,3] suggested that methods of production of the vaccine might be the important factor in reaction rates, an exhaustive study on influenza vaccine reactions in 4,127 vaccinated persons by Sadusk, Bassett and Meddaugh[6] in 1949 demonstrated that the frequency and severity of reactions was not related to the method of production but rather to the total virus content of the vaccine. These investigators also noted that the important variable in reaction rate and severity of reaction was that of sex. The reaction rate in the female group was found to be twice that observed in the male group, while the severity of reactions observed was four times as high in the female as in the male group. It was further found that (1) previous inoculation with influenza vaccine did not predispose to a higher rate of reactions, (2) the use of acetylsalicylic acid or APC (acetylsalicylic acid, phenacetin, and caffeine) tablets did not significantly reduce the reaction rate, (3) employees giving a history of hay fever or asthma showed no higher reaction rate than other persons in the vaccinated group, and (4) there was need for screening out egg-sensitive persons. Finally, in the clerical group studied, the reaction rate was significantly higher in the 15 to 24 year group than in the groups 25 years of age or over, where the reaction rate was constant. This difference was particularly pronounced in the female part of the group.

The influenza vaccines used by Sadusk, Bassett and Meddaugh[6] contained approximately 1,400 CCA

From Peralta Hospital, Oakland 9.
Submitted September 24, 1957.

INFLUENZA ANALYSIS REPORT No. 1

Last name First Middle ..... Type of work ..... Division .....

Please complete this report and return to your supervisor *5 days after* your influenza inoculation

(PLACE AN (X) IN THE BOX OR BOXES WHICH APPLY TO YOU

Sex: Col. 1

Male	☐	1
Female	☐	2

Age: Col. 2

15 to 19	☐	1
20 to 24	☐	2
25 to 29	☐	3
30 to 34	☐	4
35 to 39	☐	5
40 to 44	☐	6
45 to 49	☐	7
50 to 54	☐	8
55 to 59	☐	9
60 to 64	☐	X
65 to 69	☐	Y

Were you ill as a result of inoculation? Col. 3

Yes	☐	1
No	☐	2

Were you absent from work as a result? Col. 4

Yes	☐	1
No	☐	2

Number of days absent? Col. 5

1 day	☐	1
2 days	☐	2
3 days	☐	3
More than 3	☐	4

Check the following symptoms only if present after inoculation. Col. 6

Fever	☐	6-1
Aching	☐	7-1
Chilliness	☐	8-1
Headache	☐	9-1
Pain at site of injection	☐	10-1
Swelling at site of injection	☐	11-1
Redness at site of injection	☐	12-1
Nausea	☐	13-1
Vomiting	☐	14-1

If you had a reaction, what time did the first symptom appear after injection?

1 to 2 hours	☐	15-1
3 to 5 hours	☐	16-1
6 to 8 hours	☐	17-1
9 to 12 hours	☐	18-1
12 to 24 hours	☐	19-1
Later	☐	20-1

DO NOT WRITE BELOW THIS LINE

Vaccine: Col. 21

No. 1	☐	1
No. 2	☐	2
No. 3	☐	3
No. 4	☐	4

Skin test done: Col. 22

Yes	☐	1
No	☐	2

Skin test: Col. 23

Positive	☐
Negative	☐

Sample of form given to vaccinated persons for reporting of reactions

units per milliliter and produced an absenteeism rate of approximately 2 per cent in males and 8 per cent in females, absences usually being for one or two days. Local reaction was noted in approximately 50 per cent of males and 70 per cent of females; systemic reactions in approximately 25 per cent of males and 47 per cent of females.

Since the current influenza vaccine approved by the U. S. Public Health Service contains a total virus content of only 200 CCA units of the Asian strain of influenza virus, one would expect the reaction rate and absenteeism rate to be less. This was found to be so in the present study.

METHODS

Subjects and questionnaire forms. During the study period, there were 493 employees at Peralta Hospital, consisting of certain staff physicians, administrative staff, nurses, orderlies, maids, laundry personnel, maintenance staff and others. Immunization was offered on a voluntary basis to this group and each person accepting such inoculation was required to present himself at the appointed time with a completed questionnaire. The important questions asked were as follows:

1. Have you any allergic sensitivity to chicken? eggs? chicken feathers?
2. Do you have asthma?
3. Do you have any allergic condition?

The applicants were interviewed by a staff physician regarding hypersensitivity to egg or other widely used substances. If such allergic reaction was confirmed or suspected, vaccination of the applicant was deferred until a later date to permit

intradermal skin testing. If there was no evidence for such sensitivity, the physician signed an approval form which the employee presented to the inoculating nurse. Deep subcutaneous injection of 1 ml. of the vaccine was made in the deltoid or triceps area. A syringe containing 0.25 to 0.50 ml. of 1:1000 aqueous epinephrine for intravenous use was available at the inoculating station for immediate use should an anaphylactic reaction appear. After the person had received the vaccine, he was given a reaction report form (see page 302) with instructions to return the completed form after five days. These forms, coded for punch card use, formed the basis for the present study. They will also play a role in a study of the efficacy of the vaccine, should an epidemic of influenza appear.

On August 30, September 1 and September 11, 1957, 410 employees were immunized as described above. Skin testing of those with a positive or questionable history for sensitivity to egg was done by intradermal injection of 0.02 ml. of a 1:10 dilution of the vaccine in normal saline solution. The reaction was observed in 15 minutes; and then, after inoculation, the subject was required to wait at the inoculating station for another 15 minutes before being released.

Influenza vaccine. The vaccine used in this study was a monovalent influenza virus vaccine, containing 200 CCA units per ml. of Type A Asian Strain, prepared by Merck, Sharp & Dohme, and identified as Lot No. 40175 B-1. The product is protamine concentrated and refined.

Protocol data were not made available by Merck, Sharp & Dohme but such information as could be obtained indicated that the vaccine was made up to yield an "average CCA/ml. value of 200."

RESULTS

Return of questionnaires. Data concerning the return of questionnaires (Table 1) indicate that sufficient forms were returned to be probably representative of the group inoculated. A total of 79.8 per cent of the employees vaccinated returned forms —83.4 per cent of the men and 79.2 per cent of the women. In all, a total of 327 employees out of 410 returned forms.

Type of reactions. Table 2 presents an analysis of broad types of reaction and shows the much higher incidence in women than in men. By personal interview of inoculated persons taken at random it was learned that the reactions were generally quite mild.

In Table 3 are presented data for the specific components of the local and systemic reactions. Here again, a pronounced difference by sex is readily apparent.

TABLE 1.—*Number of Employees Inoculated with Influenza Vaccine and Returning Questionnaire Forms, by Sex*

Sex	Number Inoculated	Number Forms Returned	Per Cent Returned
Male	66	55	83.4
Female	344	272	79.2
Total	410	327	79.8

TABLE 2.—*Broad Types of Reaction Following Influenza Vaccine Inoculation in 327 Employees, of Whom 55 Were Men and 272 Women*

	Male		Female	
	Number	Per Cent	Number	Per Cent
Local reaction*	16	29.1	97	35.7
Systemic reaction†	2	3.6	24	8.8
Combined reaction‡	5	9.1	82	30.1
No reaction	32	58.2	69	25.4
Total injected	55	100.0	272	100.0

*Local pain, swelling or redness at the site of injection.

†Purely systemic reaction consisting of fever, aching, chilliness, headache, nausea, and vomiting.

‡Combination of both local and systemic reactions.

TABLE 3.—*Specific Reactions Following Influenza Vaccine Inoculation of 327 Employees, 55 Men and 272 Women*

	Male		Female	
	Number	Per Cent	Number	Per Cent
Local reaction:				
Pain	14	25.5	120	44.1
Swelling	7	12.7	57	20.9
Redness	8	14.5	103	37.9
Systemic reaction:				
Fever	2	3.6	14	5.1
Aching	1	1.8	65	23.9
Chilliness	2	3.6	27	9.9
Headache	4	7.3	59	21.7
Nausea	3	5.4	18	6.6
Vomiting	0	0	4	1.5

The incidence of all local reactions was almost twice as high in females as in males. For systemic reactions, also, there was about a twofold difference, except for an even wider difference in the incidence of aching and headache. It should also be noted that none of the men reported vomiting, as against 1.5 per cent of the women.

In Table 4 are outlined the broad categories of local, systemic, and combined reactions analyzed by age groups for male and female.

With regard to the male group, it is obvious that the numbers listed are not statistically valid and little or nothing can be said about this group. With regard to the females, in the numbers in each category and age group were so small that percentage data are not recorded. It is of interest, however, that the age group differences that were noted in the previous study[6] are not apparent in the present one —that is, the previously observed higher incidence of reactions in females 15 to 24 years of age than in

TABLE 4.—*Number of Reactions Analyzed, by Sex and Age Group, as to Whether the Reaction Was Local, Systemic or Combined*

Age Group	Male				Female				Number Injected	
	Local*	Systemic†	Combined‡	None	Local*	Systemic†	Combined‡	None	Male	Female
15 to 24 years	6	0	1	3	10	3	8	8	10	29
25 to 34 years	4	1	2	4	20	3	12	5	11	40
35 to 44 years	2	0	0	4	26	5	17	16	6	64
45 to 54 years	3	0	1	4	15	7	23	21	8	66
55 to 64 years	1	1	1	13	20	4	21	13	16	58
64 years	0	0	0	4	5	1	0	2	4	8
Not stated	0	0	0	0	1	1	1	4	0	7
Total	16	2	5	32	97	24	82	69	55	272

*Local pain, swelling or redness at the site of injection.

†Purely systemic reaction consisting of fever, aching, chilliness, headache, nausea, and vomiting.

‡Combination of both local and systemic reactions.

TABLE 5.—*Employees' Reply to Question as to "Illness" After Inoculation*

Age Group	Male			Female			Number Inoculated
	Ill*	Not Ill	Total	Ill*	Not Ill	Total	Male and Female Total
15 to 24 years	0	10	10	1	28	29	39
25 to 34 years	2	9	11	4	36	40	51
35 to 44 years	0	6	6	5	59	64	70
45 to 54 years	0	8	8	9	57	66	74
55 to 64 years	0	16	16	5	53	58	74
64 years	0	4	4	0	8	8	12
Not stated	0	0	0	0	7	7	7
Total	2	52	55	24	248	272	327

*Affirmative answer of employees to question, "Were you ill as a result of influenza vaccine inoculation?"

those 25 years of age and over, was not observed in the present study.

Severity of reactions. In Table 5 are presented detailed data on the number of persons who reported an answer to the question, "Were you ill as a result of inoculation?" Again, the answers were few, but in the case of the female group, in which the number of reports was large enough to approach statistical validity, there was no significant difference in "illness" rate between the younger and the older groups. One of the striking points is the relative absense of "illness" in the age group over 64 years, but here again the number of persons available for analysis is small.

The severity of reactions may be approached from two aspects, namely, the employees' response to the question "were you ill as a result of inoculation?" and his or her absence from work as a result of the inoculation. Such data are reported in Table 6 with a division of data by sex. Only 1.8 per cent of men reported that they were "ill" as a result of the inoculation, as compared with 9.6 per cent of the women. As to the more strict definition for severity of reaction—that is, absence from work, the data in Table 6 shows that only 1.1 per cent of women were absent as a result of the inoculation. Of the three who were absent, one was absent for one day, one for two days, and one for three days. It should be noted that one of the three women who were absent from work

TABLE 6.—*Severity of Reaction (Subjective "Illness" and Absenteeism) Following Influenza Vaccine Inoculation of 327 Employees, of Whom 55 Were Men and 272 Women*

	Male		Female	
	Number	Per Cent	Number	Per Cent
"Illness"*	1	1.8	26‡	9.6
Absence from work	0†	....	3‡	1.1
1 day	0	....	1	....
2 days	0	....	1	....
3 days	0	....	1	....
More than 3 days	0	....	0	....
Not stated	0	....	0	....

*Employees who gave an affirmative reply to the question, "Were you ill as a result of influenza vaccine inoculation?"

†One man (not included in table) reported an illness on seventh day after inoculation, characterized by fever, chilliness and headache, and necessitating a total of threee days' absence.

‡One of the women reported an illness beginning four days after inoculation, with fever, aching, chilliness, nausea and vomiting. She is included in the table, but the illness probably was not a reaction to influenza vaccine.

reported an illness beginning four days after inoculation, consisting principally of systemic symptoms such as fever, aching, nausea and vomiting. It is of course highly probable that this was an intercurrent nonspecific gastrointestinal infection and was not due to the influenza inoculation.

One man, who is not reported in this table, indicated that on the seventh day after inoculation he had an illness characterized by fever, chilliness and headache which necessitated three days' absence from work. It is quite clear that such an illness be-

ginning seven days after inoculation could not possibly be ascribed to the influenza vaccine.

Time of appearance of reaction. It will be noted in Table 7 that the great majority of reactions from influenza vaccine appeared within five hours after injection, and indeed, the greater proportion appeared within one to two hours.

It is to be noted that the reaction rate dropped sharply after the fifth hour, but began to rise between 12 and 24 hours after inoculation. It is of course extremely dubious whether the 9.6 per cent of total male and female reactions appearing longer than 24 hours after the inoculation were owing to the vaccine. Here, one strongly suspects that intercurrent acute respiratory diseases play a role. It can be stated that throughout the Oakland area, before, during and after the time of the vaccinations here reported, a nonspecific acute respiratory disease appeared to be in higher than ordinary incidence.

Possible allergy to influenza vaccine. As was noted in previous studies[2,3,4,5] by several investigators, possible allergic reactions to influenza virus must be considered. Since the vaccine is prepared from embryonated chicken eggs, it necessarily contains egg protein which, although in small quantity, could theoretically cause anaphylactic shock in person who was hypersensitive to egg protein.

Consequently, the physicians who interviewed the persons subjecting themselves to influenza immunization were requested to be very conservative with regard to the possibility of sensitivity to egg or chicken. If they had doubts in any case they were to defer vaccination until skin testing could be carried out.

As will be noted in Table 8, inoculation was initially deferred for intradermal skin testing in 21 employees, four men and 17 women. Seven employees did not return for skin testing. None of the 14 who did return had positive reaction to the intradermal skin test, as previously described, and all were inoculated. No reactions, either immediate or delayed, were reported.

TABLE 7.—*Time of Appearance of Reaction Following Inoculations with Influenza Vaccine in 135 Employees Returning Information on This Point*

Time of Appearance	Male		Female		Male and Female	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
1 to 2 hours....	4	28.6	50	41.4	54	40.0
3 to 5 hours....	5	35.7	25	20.6	30	22.2
6 to 8 hours....	2	14.3	8	6.6	10	7.4
9 to 12 hours....	0	....	7	5.8	7	5.2
12 to 24 hours....	1	7.2	20	16.5	21	15.6
More than 24 hrs.	2*	14.2	11	9.1	13	9.6
Total	14	100.0	121	100.0	135	100.0

*One additional man (not included in table) reported appearance of "reaction" on seventh day after inoculation.

TABLE 8.—*Number of Persons with History Suspicious of Allergic Sensitivity Among 327 Employees (55 Men, 272 Women) Inoculated with Influenza Vaccine*

	Male	Female	Total
Inoculation initially deferred for skin testing.....	4	17	21
Skin tested with negative test and were inoculated	2	12	14
Did not return for skin test.....	2	5	7

DISCUSSION

The data presented in the foregoing tables would indicate that all types of reaction rates and severity of reaction as determined either by reported "illness" or absenteeism are significantly lower than previously reported for polyvalent influenza vaccines.

Since it is now generally accepted that the reaction rate is directly proportional to the amount of total virus content, one would necessarily expect that the reaction rate with the present vaccine containing only 200 CCA units per ml. would be definitely lower than previous reaction rates with influenza vaccine of polyvalent type and containing up to 1,400 or 1,500 CCA units per ml.

The pronounced difference in reaction rates between men and women accords with previous observations.[1,6] The reason for the difference is not clear and the subject deserves further study.

It would appear that the danger of troublesome reactions from the present influenza vaccine is extremely small. In addition, the absenteeism rate is nil for males and approximately 1 per cent for females. Consequently, in large-scale immunization programs among hospital personnel and important public servants such as police, firemen, and utility employees, the fear that reactions will prevent full efficiency of the force is to be discounted, particularly so when one assumes a morbidity rate of 20 per cent or more during an influenza epidemic with an individual employee time loss of from five to fourteen days due to influenza.

While no evidence was found for serious acute allergic manifestations in this study, this possible danger must be kept in mind. Influenza vaccination, both on an individual and a mass basis, should clearly take into account the need for appropriate screening procedures to defer or reject persons with hypersensitivity to egg. If one is in doubt concerning an applicant for immunization, skin testing should be carried out. The present study and the one previously reported by Sadusk, Bassett, and Meddaugh[6] clearly indicated that, contrary to suggestions by Curphey,[2] by Ratner and Untracht,[4,5] and by several of the brochures the manufacturers of influenza vaccine include with each vial, routine

testing of all persons for egg sensitivity is not necessary. Careful questioning as to symptoms of allergic reaction to eggs, chicken or chicken feathers should be sufficient as a screening procedure for adults. It is to be emphasized that this recommendation may not necessarily apply to children, for the incidence of sensitivity to egg[4,5] seems to be significantly higher in children than in adults.

459 Thirtieth Street, Oakland 9 (Sadusk).

ACKNOWLEDGMENTS

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Postoperative Bile Peritonitis

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FOR MANY YEARS surgeons have been aware of the dangers of extravasation of bile. Fortunately this complication is rare, although there are many different mechanisms that may cause it. Bile peritonitis occasionally occurs following surgical procedures on the liver and biliary passages. In the medical literature surprisingly little attention has been paid to this problem. Unless promptly treated, such intraperitoneal bile collections can become extremely extensive and occasionally contribute to death.

• Bile peritonitis may occur after open operations on the biliary tract or following needle biopsy of the liver.

Usually it is secondary to rupture of the common duct caused by overlooked common duct stone.

Sterile intraperitoneal bile collections may be tolerated fairly well for long periods.

Placing drains in the abdomen after biliary tract operations helps prevent dangerous accumulations of bile.

Patients with extensive bile peritonitis should be operated upon as soon as possible. Ideally, the operation should include drainage of the abdomen and repair of any underlying pathological cause, but the condition of the patient may be so poor that only drainage can be carried out at the moment.

ETIOLOGY

Congenital biliary tract defects may rarely necessitate an emergency operation on an infant to relieve bile peritonitis. Byrne and Bottomley[6] cited the example of a three-weeks-old child whose peritoneal cavity was filled with bile. The source of the leak was a rupture of a congenital cyst in the region of the cystic duct. A somewhat more common cause of bile peritonitis is traumatic rupture of the liver, bile ducts or gallbladder. Norgore[20] collected reports of 32 such cases from the literature. Usually, of course, the extravasation of blood greatly exceeds in importance the spillage of bile. Neoplasms of the extrahepatic biliary passages may rarely grow in such a manner that perforation is caused by necrosis or increased intraductal pressure, with resultant leakage of bile.

Inflammatory lesions of the biliary passages are the commonest causes of bile peritonitis. Many cases have been reported of free bile in the peritoneal cavity without demonstrable perforation of the biliary tract. This so-called "biliary dew" is seen at any age. Hindmarsh[12] reported the case of a 22-month-old infant with free intraperitoneal bile and no visible abnormalities in the biliary system. The patient responded to surgical drainage, and subsequent cholecystograms were normal. Cope[8] reported several cases of diffuse bile peritonitis without obvious perforation. Several other investigators described similar experiences. In many such instances careful study revealed tiny perforations, sometimes microscopic in size, to be the source of leakage.

Fletcher and Ravdin[9] emphasized that perforation of an acutely inflamed gallbladder is uncommon. In a study of 2,807 cases of cholecystectomy over a 15-year period, they classified 600 as acute cholecystitis, and in only 44 of the latter did perforation occur. In 25 cases it was subacute perforation with pericholecystic abscess, in 14, chronic perforation with cholecystenteric fistula. In only five patients was there acute free perforation resulting in large amounts of bile and pus in the peritoneal cavity without evidence of localization. It has been my experience also that acute free perforation of the gallbladder is rare; I have seen only two such cases in recent years.

Rupture of the common bile duct is also occasionally the cause of bile peritonitis, even in cases in which there has been no previous operation. Chodoff and Levin[7] collected reports of 14 cases of spontaneous perforation of the common duct. Usually a common duct stone is present, but Hart[11] and Moore[16] independently presented cases of spontaneous common duct perforation without associated calculi or trauma or previous operation.

Postoperative bile peritonitis is likewise a rare entity. In a review of the literature, reports of fewer than two dozen cases were found in which sufficient bile extravasation occurred in the postoperative period to require a second laparotomy.

BILE PERITONITIS FOLLOWING OPEN OPERATION ON THE BILIARY TRACT

Postoperative bile peritonitis occurs most commonly following open operations on the liver, gallbladder or bile ducts. The ordinary mechanism is

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Presented before the Section on General Surgery at the 86th Annual Session of the California Medical Association, Los Angeles, April 28 to May 1, 1957.

postcholecystectomy rupture of the common bile duct due to increased intraductal pressure resulting from an overlooked common duct stone. Wolfson and Levine[24] called attention to this problem by presenting reports of three cases of bile peritonitis following common duct exploration. In these cases reoperation was done and the abdomen was drained of large amounts of bile 32, 55, and 72 days after operation, respectively. In only one of them was the presence of residual common duct stone determined. Wolfson and Levine expressed belief that the usual cause of this complication was a subacute infectious process at the site of the choledochostomy. Newburger[18] collected from the literature reports of nine cases of confirmed rupture of the bile duct following biliary operation which consisted of a choledochostomy in all but one case. All the patients were female, and all but one died of the complication. In a case observed by Newberger, reexploration of the abdomen was required 102 days after cholecystectomy and common duct exploration. Some 2,000 cc. of bile was evacuated from the peritoneal cavity, but the patient died four days later. Brunschwig[4] reported two cases of postcholecystectomy rupture of the common bile duct, in both of which residual common duct stones had been overlooked. One patient died without opportunity for surgical correction of bile peritonitis, but the other recovered following laparotomy with drainage of a large amount of bile from the subhepatic area and removal of the retained stone.

McLaughlin[14] presented an excellent review of the problem of bile peritonitis when he summarized eight cases. In three of them, reoperation to drain bile collections was necessary. Two of the three illustrate the risk of performing cholecystectomy without drainage of the abdomen; in both a secondary operation was necessary in the early postoperative period to evacuate intraperitoneal bile. McLaughlin emphasized that increased pressure within the biliary tree from overlooked common duct stones is the most frequent factor in production of bile peritonitis. Maguire[13] reported a similar problem in a 57-year-old man who had to have two further operations to drain large intraperitoneal bile collections after cholecystectomy, despite drainage of the abdomen after the original operation. In the case of this patient the common duct ruptured on the fifth postoperative day, and months later a repair of a common duct stricture was necessary.

Postoperative bile peritonitis is occasionally confused with bile-stained peritonitis following gastrointestinal anastomosis. Bell and Warden[2] reported a case of a 39-year-old man who underwent laparotomy 48 hours after gastric resection for jejunal ulcer. No gross leak was found but 2,000 cc. of bile-colored fluid were evacuated from the abdomen, although no operation had been done on the biliary passages. Apparently the color of the peritoneal exudate was due to leakage of the intestinal content.

Following is a report of a case of bile peritonitis probably due to overlooked common duct stone with leakage from a cystic duct stump.

CASE 1. A 71-year-old woman underwent elective cholecystectomy for gallstones in January 1954. At the same time repair of a small ventral hernia was done. Several medium sized gallstones were present but there was no evidence of acute cholecystitis. No aberrant ducts were noted, and the common duct was not opened. A Penrose drain was used. On the sixth postoperative day a large amount of bile drained through the dressings, soaking the binder and sheets. At this time a low-grade fever appeared, and it persisted. Bile drainage ceased at the time the drain was removed on the tenth postoperative day. The patient continued to have nausea, upper abdominal pain and distention. Occasional administration of narcotics was necessary. Although improvement was slight, the patient was sent home by ambulance on the seventeenth day after operation, partly at her own request. Bile was regularly present to some degree in the stools. Because of vomiting, weakness and increasing abdominal distention, she was readmitted to the hospital 31 days after operation. The next day a large swelling, apparently a collection of fluid, was easily visible in the upper abdomen. The patient complained of severe pain. Nasogastric suction did not relieve the distention. X-ray films of the abdomen showed haziness throughout the upper abdomen consistent with a large collection of fluid. The position of the Levine tube indicated that the stomach was remarkably displaced to the left and inferiorly by extrinsic pressure. There was no evidence of jaundice. The temperature varied from 99 to 100°F. Hemoglobin content was 9.9 gm. per 100 cc. of blood. Leukocytes numbered 13,650 per cu. mm.—70 per cent polymorphonuclear cells. Sedimentation rate was 93 mm. in one hour.

Because of the general progressive deterioration of the condition of the patient, laparotomy was done 33 days after the first operation. Local procaine block was used for anesthesia. The preoperative impression was of either pancreatic cyst or intraperitoneal collection of bile. When the abdomen was opened by a short left rectus incision, a great amount of intraperitoneal bile was seen. Approximately 6,000 cc. of it was aspirated over a 20-minute period. Immediately the patient felt better. Two large drainage tubes were put into the peritoneal cavity. Exploration of the biliary passages was precluded by the poor general condition of the patient. She was discharged to her home two weeks after operation. Bile drainage was still profuse, requiring several dressings a day. The pyloric obstruction and vomiting were promptly relieved by the operation. A mod-

erate external biliary fistula persisted for several months but the patient never became jaundiced and the stools were bile-colored. Common duct exploration was advised to find out whether there might be a retained common duct stone, but permission was not obtained. After four months the fistula closed and the patient continued in good health.

The following case was one of bile peritonitis probably due to spasm of the sphincter of Oddi with increased intraductal pressure and leakage from the site of a T-tube.*

CASE 2. A 35-year-old man was admitted to hospital October 17, 1956, because of pain in the lower back and upper abdomen. In a myelogram the following day no abnormality was noted. A cholecystogram showed a poorly functioning gallbladder containing several opaque stones. Cholecystectomy and choledochostomy were done as an elective procedure. The patient was not icteric. The common duct did not appear dilated but a small catheter was inserted into the cystic duct stump and was threaded into the common duct. Diodrast® was injected and an operative cholangiogram was made. Because of two small shadows appearing in the common duct, it was opened and explored directly. No stones were found and no pancreatitis or evidence of obstruction was seen. Two more operative cholangiograms were then made, the dye being introduced through a No. 10 (French) T-tube, and the final set of films showed no filling defects. It was assumed the shadows seen earlier were due to air bubbles. The gallbladder was thin-walled and was removed. It contained two stones, each about a half inch in diameter. No aberrant ducts were noted. On the seventh postoperative day another cholangiogram was made. No abnormalities were seen; the dye entered the duodenum promptly, and the caliber of the ductal system was normal. The following day the T-tube was uneventfully removed. Several hours later, during the night, the patient had extreme pain in the right upper quadrant with radiation into the scapular area. The pain was described as constant and knife-like, causing much restlessness and muscle guarding in the right upper quadrant of the abdomen. There was no drainage from the T-tube tract. The following day the patient complained of pleuritic pain, but there was no fever at any time during the day. Progressive improvement took place and he was discharged from the hospital the eleventh postoperative day, three days after removal of the T-tube. At this time the hemoglobin was 15.7 gm. per 100 cc. and leukocytes numbered 19,650 per cu. mm., 76 per cent of them polymorphonuclear cells. The patient was readmitted to the hospital the following day because of severe pain in the upper abdomen, associated with tenderness in the right upper quadrant. The skin was yellow. Leukocytes numbered 34,150 per cu. mm.—89 per cent polymorphonuclear. Serum bilirubin was 5.9 mg. per 100 cc. The alkaline phosphatase was 9.6 units (normal 1.5 to 4.0 units). Cephalin flocculation at 48 hours was negative.

X-ray films at this time showed an inflammatory process in the right lower lung field with compression atelectasis and some pleural effusion. The right hemidiaphragm was elevated.

During the next three days the temperature ranged from 100 to 101°F. and the pulse rate from 100 to 120. The general condition of the patient deteriorated and the abdomen became distended. On the sixteenth postoperative day, a right subcostal incision was made and a large collection of bile—about 1,000 cc.—was seen in the right upper quadrant, both above and below the liver. Several large Penrose drains were placed in this region and the abdomen was closed. No further exploring was done and no point of bile leakage was found. The patient's condition remained critical for several days but recovery gradually occurred, and the temperature was almost normal at the end of two weeks. A moderate amount of bile drainage persisted through the drains for several days. When the last drain was removed 12 days after the second operation, there was very little exudate from the operative field. The patient remained well.

As no calculi were found at the time of common duct exploration, and considering the normal cholangiograms, it seems unlikely that bile leakage might have been brought about by an overlooked common duct stone.

*Courtesy of Dr. W. H. Stephenson.

BILE PERITONITIS FOLLOWING NEEDLE BIOPSY OF THE LIVER

In rare instances bile peritonitis may occur as a complication following needle biopsy of the liver, a procedure that has come into wide use during the last decade. As with trauma to the liver from accidental means, the risk of hemorrhage is far more important and occurs more frequently than that due to bile extravasation.

Terry[23] in 1952 assessed the risk of this procedure in evaluating over 10,000 needle biopsies recorded in the literature. He computed a mortality of 0.12 per cent and an incidence of major complications of 0.32 per cent. In a series of cases in which he had carried out the procedure, severe bile peritonitis occurred in one instance. The patient was a 63-year-old man and laparotomy was done on the thirteenth day to drain 4,500 cc. of bile from the abdominal cavity. The patient recovered. Zamcheck and Klausenstock[25] in 1953 made an exhaustive survey of all reported complications of needle biopsy of the liver up to that year, reviewing more than 20,000 cases. It was their opinion that with the pro-

cedure properly done, the mortality rate was less than 0.1 per cent. Bile peritonitis was thought to be the cause in only four of 39 deaths. Schiff[22] recently observed a case in which bile peritonitis following needle biopsy caused death. In none of these cases was the diagnosis made sufficiently early to permit laparotomy for drainage. Gallison and Skinner[10] demonstrated clearly in a photomicrograph how the biopsy needle produced a fistulous tract 1.5 cm. long from a dilated intrahepatic duct. The patient died in seven days with 8,000 cc. of bile lying within the peritoneal cavity. In that case, carcinoma of the ampulla was found to be the cause of obstructive jaundice that had led to needle biopsy.

The following is a report of a case of extensive bile peritonitis, following needle biopsy of the liver, in which laparotomy was necessary for drainage.

CASE 3. A 76-year-old retired businessman had had cholecystectomy for gallstones 25 years previously. He had been quite well from then until about a year before the present illness, when he began having bouts of upper abdominal pain, fever and light jaundice, lasting usually two or three days. Upon physical examination, the liver was observed to be moderately enlarged. No abnormality was noted on x-ray examination of the stomach except for prominent angulation between the first and second portions of the duodenum, presumably the result of previous cholecystectomy. The blood sedimentation rate was 105 mm. in one hour. Total protein content was 8.1 gm. per 100 cc., of which albumin was 2.9 and globulin 5.2 gm. The serum bilirubin was 4.0 mg. per 100 cc. A subcostal liver biopsy was done with a Vim-Silverman needle. Two hours later the patient complained of pain at the biopsy site, and throughout the rest of the day dull pain persisted in the upper abdomen. Over the next four days the abdomen became progressively more distended and paralytic ileus developed. The leukocyte content of the blood increased from 6,250 to 24,250 per cu. mm. in 48 hours and the proportion of polymorphonuclear cells was 86 per cent. The temperature gradually increased to 101°F. A Harris tube did not decompress the abdomen, which became progressively more distended and tense.

Procaine infiltration of the abdominal wall was used for anesthesia because of the patient's semicomatose critical condition. When the abdomen was opened, bile gushed from it. The amount removed was estimated at over a liter and a half. A tube enterostomy was carried out to relieve some of the intestinal distention. Several Penrose drains were placed in the peritoneal cavity. Exploration of the biliary passages was precluded by the general condition of the patient. After a brief postoperative rally the patient lapsed into hepatic coma and in three days died of liver failure.

At autopsy an entirely unique situation was found. The common bile duct had undergone a complete stricture formation subsequent to the cholecystectomy that had been done 25 years previously. The dilated hepatic ducts at the hilus of the liver had spontaneously ruptured into the duodenum, and this small hepaticoduodenal fistula had functioned well enough to enable the patient to lead a normal life for over two decades. Numerous dilated intrahepatic bile ducts were present, and the biopsy needle had pierced one of these ducts near the surface of the left lobe of the liver; and this opening was the source of the extensive extravasation of bile. Severe portal cirrhosis was also present.

DISCUSSION

The three cases here reported illustrate the dangers of bile peritonitis. The fact that one of the patients survived despite accumulation of six liters of bile within the peritoneal cavity would indicate that sterile bile is not extremely dangerous. In certain cases, bile can be tolerated reasonably well in the abdominal cavity for long periods. Miles and Jeck[15] among others, observed a similar situation and, in a study of the problem, carried out experiments with dogs. They expressed belief that the toxicity of the bile salts is one of the most important factors leading to death from pile peritonitis. Collections of bile can cause susceptibility to superimposed infection, they observed, due to the local necrotizing effect of bile on the peritoneum and viscera; and prognosis turned in great degree upon whether or not infection was present. Shock from fluid loss into the extravascular space may be of importance in certain cases, the investigators noted. The lethal dose of sterile bile injected intraperitoneally into dogs varied from 20 to 40 cc. per kilogram of body weight.

When bile is spilled into the peritoneal cavity, the resulting inflammatory reaction will produce exudate from the peritoneum, which dilutes the bile. As was pointed out by Ravdin,[21] bile ascites must be differentiated from bile peritonitis. A relatively small amount of bile can discolor a large volume of peritoneal effusion. Bowers[3] reported the daily removal, by paracentesis, of 5 to 6 liters of bile-colored fluid, obviously a far greater volume than the daily total bile production by the liver.

Much debate has taken place with respect to the importance of drainage of the abdomen after cholecystectomy. Some skilled surgeons rarely place drains in such cases, but the majority are agreed that the use of drains affords additional protection against postoperative bile leakage. I routinely place drains in all cases of biliary tract operation.

Possible causes of postoperative bile extravasation

include rupture of the common duct due to obstruction or infection, leakage from accessory hepatic ducts, failure to drain the common duct after exploration, unnoticed trauma to the bile ducts, slippage of the cystic duct ligature, and partial dislodgment of the T-tube. A significant contribution was made by Allen and Wallace,[1] who emphasized that a watertight closure of the common duct is extremely difficult to obtain. Bile drained into the dressing in all but one of 28 cases in which the common duct was closed tightly without T-tube or catheter drainage. Without free flow to the outside, some degree of bile peritonitis would invariably occur.

The following cases illustrate the potential creation of bile peritonitis, but adequate drainage permitted the bile to localize its exit as an external biliary fistula. Omitting drainage would certainly have resulted in serious complications and possible disaster.

One was a case of postcholecystectomy rupture of the common duct due to an overlooked stone.

CASE 4. A 65-year-old housewife with severe diabetes and Paget's disease, had cholecystectomy for subacute cholecystitis with cholelithiasis. The operation was more difficult than usual because of inflammation and an anomalous double hepatic artery which overlay the common duct. She had three attacks of biliary colic in the immediate postoperative period, associated with mild icterus. The Penrose drain was removed in one week as there was no unusual drainage. The patient went home nine days after the operation. On the twentieth postoperative day, bile began to drain through the former site of the Penrose drain, and a complete external biliary fistula developed. A fistulogram was made by injecting Diodrast and an impacted stone was outlined at the ampulla of Vater and a second stone in the hepatic duct. Choledochostomy was done and the two stones were removed after a transduodenal sphincterotomy. The patient recovered.

The other case was one of prolonged external biliary fistula from an accessory hepatic duct after cholecystectomy.

CASE 5. A 44-year-old housewife had cholecystectomy because of a tense subacutely inflamed gallbladder containing multiple stones. The common duct was not explored. An accessory hepatic duct that originated at the gallbladder bed in the liver and entered the gallbladder near the cystic duct was ligated with catgut. Convalescence was normal until the eighth postoperative day, 24 hours after the Penrose drain had been removed. Suddenly bile gushed from the drainage tract which continued as an incomplete, although large, external biliary fistula. The patient went home on the seventeenth postoperative day. Profuse bile drainage continued for nearly two months, and then stopped rather suddenly just when preparations were being made to reopen the abdomen. During this time bile was also entering the intestinal tract, indicating there was no obstruction of the common duct. The patient thereafter was in good health.

In both of these cases, generalized bile peritonitis might have developed if drains had not been placed after cholecystectomy. Fortunately the drains were left in place a full week after operation, because the bile leak did not occur until the eighth day in one, and the twentieth day in the other. It is quite likely that bile extravasation of minor degree often stops spontaneously. Drainage of enough bile to saturate the dressings for a few days after cholecystectomy is not unusual and does no harm unless large amounts stay within the abdomen. Usually drainage of this kind is owing to leakage from tiny accessory hepatic ducts that were severed fortuitously as the gallbladder is being removed from its bed in the liver.

DIAGNOSIS AND TREATMENT

Whenever a patient who has had biliary tract operation does not progress satisfactorily in the immediate postoperative period, the possibility of bile peritonitis should be considered. Undoubtedly many more cases occur than are reported. The symptoms of increasing abdominal distention, nausea and dull pain in the upper abdomen should warn of the possible extravasation of bile. Usually the number of leukocytes increases rapidly and out of proportion with the low grade fever. If a tube has been placed in the abdomen, it should be loosened to ascertain that it is not damming rather than draining. If fluid formation is considered likely in the postoperative period, it is well to place a catheter inside the Penrose drain to facilitate drainage. When doubt exists as to the diagnosis, aspiration of material from the abdomen with syringe and needle might provide a clue. X-ray visualization will occasionally show an elevated hemidiaphragm and other signs suggestive of subphrenic abscess, possibly due to bile leakage.

Bile extravasation in the postoperative period will usually not be manifest for a week or more. In most cases in which reopening of the abdomen becomes necessary, the operation is done from two weeks to two months after the initial operation. Some of this delay may be due to failure to recognize the possibility that extravasation of bile is taking place; and delay may be disastrous.

It seems clear that patients with extensive bile peritonitis should have surgical drainage at the earliest possible date. Often the general condition of the patient is so poor that only drainage of the abdomen can be done and exploration of the biliary

passages must be put off. Simple abdominal drainage is technically easy and can usually be carried out with only local anesthesia. It will relieve the emergency and in some cases may be all that is necessary. However, in most instances further exploration of the bile ducts must be done to find the source of leakage and the underlying cause.

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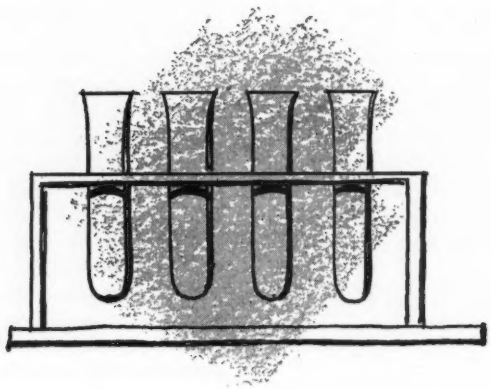

Staphylococcic Infections in Children

RICHARD KOCH, *M.D.*, and GEORGE DONNELL, *M.D.*, Los Angeles

• **Over 50 per cent of all staphylococcic infections are hospital-acquired. In 92 per cent of hospital-acquired infection, the organism is resistant to penicillin, and in 74 per cent to tetracycline.**

Chloramphenicol, bacitracin, novobiocin and erythromycin are the drugs of choice for therapy. There was good correlation between clinical response and antibiotic therapy selected on the basis of results of organism sensitivity tests done by the agar diffusion technique.

Cross-resistance among the tetracyclines averaged 94 per cent. Erythromycin and magnamycin showed similar pattern.

Mortality in infants less than two months old was 7.8 per cent as compared with 1.1 per cent in older children. Death was related either to pneumonia or to septicemia in the ten fatalities recorded in this series.

THE STARTLING INCREASE in infections due to Staphylococcus pyogenes var. aureus during the last few years is a matter of great concern to all physicians. Epidemics in nurseries for newborn babies[3,4,15,16,18] and operative wound infections[1,14,19] due to this organism are being encountered with alarming frequency and emphasize the need for strict aseptic technique in the care of patients. A single phage type of staphylococcus (52 B/42 E/44 A/81)[2,17] accounts for the majority of these infections. The ability of this organism to adjust to its antibiotic environment is one of the major problems in medicine today. In order to evaluate the gravity of this problem, all cases of staphylococcic infection observed at the Los Angeles Childrens Hospital on which sensitivity tests were made were reviewed.

MATERIAL AND METHOD

This report is based on 55 cases in 1952, 77 in 1954 and 348 in 1956. The age of the children ranged from 2 days to 15 years. Fifty-one per cent were boys and three-fourths were Caucasian.

Sensitivity tests by the agar plate diffusion method were performed only on coagulase-positive strains obtained from clinically ill patients. Ninety-one per cent of the specimens tested were obtained from patients in hospital.

During the years studied there was a sixfold increase in the incidence of staphylococcic infection. Fifty-one per cent could be traced to hospital contact on the wards or to repeated visits to the outpatient department. Chart 1 shows that in these patients, one-third of the infections were in operative wounds. Forty-two per cent of these patients were less than two months of age, a fact which illustrates the hazard of exposure to hospital strains.

The incidence was uniform throughout infancy and childhood. In spite of nursery epidemics due to this organism, only 18.3 per cent of the 480 patients in the cases reviewed were under two months of age. However, infection among the very young was more severe and occasionally accompanied by gangrene and septicemia. Breast abscesses, pyoderma, parotitis and pneumonia were common. Chronic disease such as fibrocystic disease of the pancreas or leukemia predisposed older children to infection with this organism.

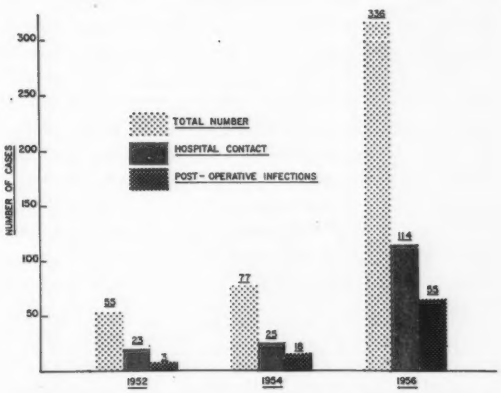

Chart 1.—Fifty-one per cent of the 468 staphylococcic infections originated from contact with hospital strains.

SOURCE OF CULTURE AND RESISTANCE PATTERN

The respiratory tract, the blood and the subcutaneous tissues were the three chief sources of material from which staphylococci grew. Table 1 shows that in comparison with 1952 and 1954 staphylococcic infection appeared somewhat more frequently in postoperative wounds and subcutaneous infections in 1956. Among the hospital-acquired infections,

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TABLE 1.—*Source of Material That Grew Staphylococci on Culture in 480 Cases in 1952, 1954 and 1956, Showing Uniform Increase in Total Number, but Changes in Proportions*

Source	1952 Cases	1952 Per Cent	1954 Cases	1954 Per Cent	1956 Cases	1956 Per Cent
Respiratory tract	25	45.5	28	36.4	156	44.0
Blood	8	14.5	6	7.8	23	6.0
Postoperative wounds	5	9.1	13	16.8	53	15.0
Abscesses	4	7.3	12	15.6	64	20.0
Miscellaneous	13	23.6	18	23.4	52	15.0
Total	55	100	77	100	348	100

92 per cent were resistant to penicillin and 74 per cent to tetracycline (Chart 2). Resistance of the organism to these two drugs was least in the case of patients who had had neither previous contact with hospital strains of staphylococci nor antibiotic therapy before admission. In the latter group the organism was resistant to penicillin in 54 per cent of cases and to tetracycline in 35 per cent. In Chart 3 the comparison of the years 1952, 1954 and 1956 shows a continued high resistance to penicillin. Staphylococcic resistance to chloramphenicol and erythromycin was much less frequent, probably reflecting the restricted usage of these drugs. Resistance was most likely to develop in patients with protracted debilitating disease; and repeated cultures from such sources developed decided resistance to penicillin and tetracycline (Table 2). Resistance of the organism to all antibiotics was unusual; only 5 per cent of the 348 cultures made during 1956 were resistant to penicillin, tetracycline, erythromycin and chloramphenicol. Cross resistance to the tetracyclines occurred in 94.5 per cent of cases (Chart 4) and to erythromycin and magnamycin in 94 per cent.

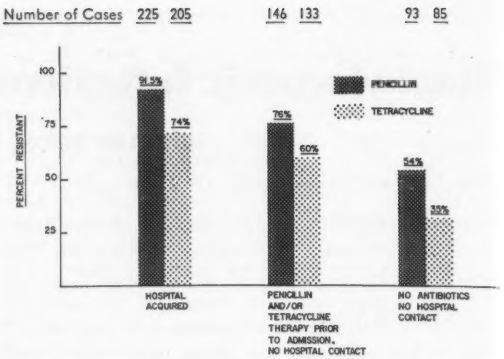

Chart 2.—The resistance to penicillin and tetracycline in three groups of patients: The first group had hospital acquired infections; the second group is composed of patients treated with antibiotics before admission, and the third group consists of patients with neither hospital exposure nor previous antibiotic therapy.

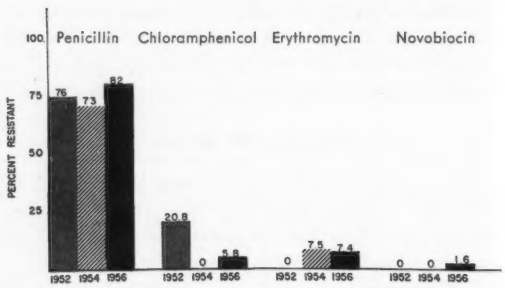

Chart 3.—The changing pattern of resistance of staphylococci to penicillin, chloramphenicol, erythromycin and novobiocin in the years 1952, 1954 and 1956.

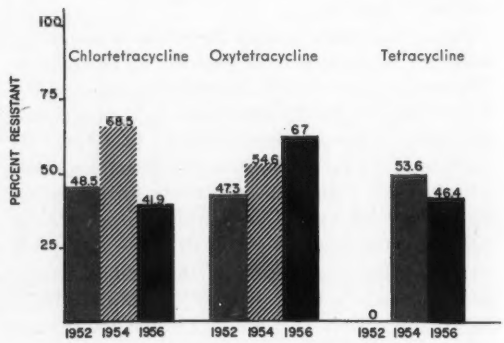

Chart 4.—The changing pattern of staphylococcic resistance to tetracycline with 94.5 per cent cross-resistance.

CLINICAL RESULTS

Sensitivity tests, drug therapy and clinical course were studied in all 480 cases. These were divided into three groups. The first was composed of 326 patients treated with an antibiotic to which the infecting organism was very sensitive; and in this group 86 per cent improved rapidly and were cured. The second group was made up of 80 children who were treated with an antibiotic to which the organism was resistant; 41.5 per cent improved, and in these patients fever persisted longer and recovery was slower. The third group consisted of 74 patients not treated with any antibiotic. In this group the infections were relatively mild, such as postoperative wound infections, pyoderma and subcutaneous abscesses. The recovery rate was 53.5 per cent—a better rate than that for the group with drug-resistant infection treated with antibiotics.

In contrast to cases of infection with other organisms, clinical relapse was common. Premature cessation of therapy was the most frequent cause; and three to six weeks of therapy was often necessary to cure systemic infections such as pneumonia, osteomyelitis and septicemia. In the severe cases at

TABLE 2.—*Increasing Resistance of Staphylococci to Various Antibiotics with Repetitive Cultures from the Same Source*

Name of Antibiotic	First Culture Total Resist.		Second Culture Total Resist.		Third Culture Total Resist.		Fourth Culture Total Resist.	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Penicillin	179	85	38	95	15	100	3	100
Tetracycline	181	56	40	77.6	15	87	3	100
Erythromycin	183	3.3	36	13.8	12	25	3	67
Chloramphenicol	175	5.1	38	14.5	15	6.7	3	67

least two and sometimes three drugs to which the organism was sensitive were used. Chloramphenicol together with erythromycin or bacitracin were the drugs most frequently used. With this plan of therapy only two of the 23 infants with pneumonia and empyema died in 1956; and in one of these the correct diagnosis was not made and the infant did not receive adequate antibiotic therapy. Death was invariably associated with either septicemia or pneumonia (Table 3). Six of the ten deaths from primary staphylococcic infection happened in infants less than two months of age; and in four of these cases the infection was acquired in the hospital. The mortality rate in this group under two months of age was 7.8 per cent, as compared with a rate of 1.1 per cent in older children.

Infections associated with chronic illness were difficult to treat. Among children with diseases such as leukemia, malignant growth or fibrocystic of the pancreas, 49 died with associated staphylococcic infection. These patients died in spite of the use of antibiotics to which the infecting strains of staphylococci were sensitive.

TABLE 3.—*Pathological Diagnosis in Ten Patients in Whom Staphylococcic Infection Was the Cause of Death*

	No. Cases
Septicemia	2
Subacute bacterial endocarditis	2
Pneumonia, empyema, and pyopneumothorax	2
Pneumonia, empyema, and congenital heart disease	2
Meningitis	1
Pneumonia, empyema, and pericarditis	1

DISCUSSION

The resistance to antibiotics of staphylococci in any community is determined by the local use of antibiotics.[9,10,11,12,21] Penicillin and tetracycline are the two antibiotics most frequently prescribed. Chloramphenicol has not been extensively used since its hematologic toxicity was widely reported in 1952. This, undoubtedly, is the reason for the low resistance rate to chloramphenicol of staphylococci cultured in our community. The low incidence of resistance to erythromycin, novobiocin and bacitracin can also be so ascribed. It is imperative that physicians restrict the use of antibiotics to patients with specific bacterial infection.[6] It is wise not to use antibiotics in the treatment of mild respiratory infections[7] or as prophylactic medication in surgical procedures.[5] Weinstein[20] suggested that prophylactic administration of antibiotics for measles is unwarranted, and Lepper[13] arrived at the same conclusion with respect to patients subjected to tracheotomy. Finland[8] obtained similar results in a study on premature infants. Since many of these infections are acquired through hospital contact, it is vitally important to reduce such contacts to a minimum. Newborn infants are particularly subject to infection and should be discharged from the nursery as soon as possible. Elective surgical procedures in infants should be delayed whenever possible, and strict adherence to aseptic technique with gown, mask and hand-washing are mandatory for every physician working with small infants.

Sensitivity tests are of great value when performed by the disc method in a reliable laboratory. The clinical results reported here clearly demonstrate that patients receiving antibiotics to which their infecting organism was sensitive improved more rapidly than children treated with drugs to which the organism was resistant. In fact the data presented suggested that therapy with a resistant drug delays clinical improvement.

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Infectious Polyneuritis

A Disease to Be Distinguished from Poliomyelitis

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• **Fourteen cases of infectious polyneuritis of a kind not previously reported in this country were observed in Los Angeles—three of them in hospital personnel. The clinical features at onset were headache, fever, dizziness of peculiar order, weakness and aching muscles. Motor weakness then developed, more severe in the proximal muscle groups and more often in the lower extremity. Sensory changes were also present. In two cases, debility was so severe as to necessitate prolonged inactivity. The condition was observed in 13 females (one a child) and one man. The age range was 10 to 65 years.**

Similarity of this illness to one reported in England in 1954 was noted.

Treatment included administration of multiple vitamins, B_{12} and thiamine chloride. Recovery occurred in from one week to over ten months.

IN THE SPRING AND EARLY SUMMER of 1956, an illness was observed with clinical features resembling those of poliomyelitis in many ways. In June a report of seven cases was presented at a staff meeting at Cedars of Lebanon Hospital. In the next few weeks an additional four patients with the illness were observed. While a fuller report was being prepared for publication, the syndrome seemed to pass away. Hence the report, having lost much of its import, was set aside. However, three cases in which symptoms closely resembled the syndrome of 1956 were observed in the spring of 1957, making the report once more of significance.

The disease is a polyneuritis with predominantly motor changes, but often with sensory changes also. At a time when physicians generally are on the alert for poliomyelitis, it becomes important to present a condition which must be considered in the differential diagnosis of an infectious disease associated with muscular weakness.

In the series of cases in 1956 all but one of the 11 patients had a clear-cut history of an infection, with symptoms closely paralleling those of the then current "bug of the month"—fever, malaise, dizziness, and possibly headache, cough, nausea and vomiting. The illness was in general protracted, the symptoms—other than the muscular weakness—lasting for from one to three weeks. Both motor and sensory deficits—which lasted up to several months—were noted usually during the acute phase but also as long as two months after the original illness. The dizziness, which was so often mentioned, was described as a light-headed, blacking out feeling when walking fast, bending over, or turning corners—more giddiness than true vertigo.

REPORT OF 11 CASES IN 1956

CASE 1. A 26-year-old woman physiotherapist was seen in April, 1956, with complaint of fever, a slightly productive cough, malaise, dizziness and a fainting episode followed by a severe headache. On the fifth day of the illness, and the day following the fainting episode, she mentioned feeling generally weak. On examination it was observed that there was definite weakness of the extensors, flexors and rotators of the right hip, of the flexors and extensors of the right knee and of the right plantar flexor. The patient was put in hospital with a tentative diagnosis of neuronitis, but the possibility of poliomyelitis weighed heavily on both patient and physician. However, the cerebrospinal fluid protein and cell content were not abnormal. Nor were there abnormalities as to blood examination, urinalysis, heterophil agglutinins or x-ray films of the spine. Slight but definite sensory changes in the form of hypesthesia of the right leg and perianal region were noted. They persisted for a week. After three days in the hospital, weakness of the left leg, particularly of the hip flexors, was noted for the first time. By the sixth day in hospital, muscle strength began to improve in the right leg. A few days later improvement began in the left also. As strength returned, physiotherapy in the form of active and passive exercise was begun. The left leg soon was normal again and over the ensuing three months the right leg gradually returned to normal. During that time the patient often complained of aching pains in the right thigh when she overdid. During convalescence there was an episode of sciatic neuralgia which lasted two days.

An electromyogram made two weeks after onset showed polyphasic motor units, and another made five weeks later showed denervation fibrillations as well—phenomena consistent with peripheral neuritis.

CASE 2. In early April, quite by accident, winging of the right scapula was noted in a 24-year-old nurse who worked in the department of rehabilitation. On questioning she recalled that in late February she

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Submitted August 1, 1957.

had noted malaise, weakness, dizziness, slight fever and pain between the scapulae. Upon examination, weakness of the right deltoid muscle, serratus anterior and biceps was noted. Hypesthesia was observed about the right shoulder. In May, slight bilateral foot drop was first noted by the patient and at that time weakness of all movements of both lower extremities—about the hips, knees and ankles—was noted. An electromyogram of the right deltoid and biceps showed polyphasic motor units and denervation fibrillations—conditions consistent with peripheral neuritis. Over the next three months there was a progressive return to normal muscle strength.

CASE 3. A 35-year-old drug detail man, with no history of preceding illness, had rather sudden onset of pain on the right side of the neck going down the shoulder and into the right arm. Later the patient noticed easy tiring of the arm. Upon examination, it was observed that there was decided weakness of the right deltoid and lesser weakness of the biceps, the serratus anterior and the dorsiflexors of the hand.

CASE 4. The patient, a housewife, 39 years of age, who had had poliomyelitis in 1947, was observed because of illness that began with the sudden onset of dizziness, nausea, vomiting, severe headache, especially when standing, and generalized weakness. Upon examination pronounced weakness was noted in all muscle groups tested, including those innervated by cranial nerves. There was hypesthesia over most of the body. The right arm and leg (in which there was slight residual weakness from poliomyelitis) as well as the left arm and leg, were so weak that motion could be restrained by the examiner's using only two fingers to hold the various limbs. Pains in the legs, arms and back became a pronounced complaint. Headache lasted a week and dizziness persisted several weeks.

Three weeks after the onset of symptoms the patient complained of a persistent bothersome pain, neuralgic in nature, in the left lower anterior area of the rib cage, near the xiphoid process. This persisted about two weeks.

Four weeks after onset the patient was put in hospital. Results of examination of spinal fluid, of heterophil agglutinin, of blood and of urine were within normal limits. An electromyogram at this time showed denervation fibrillations in the arms and the legs as well as in the neck muscles. No abnormality was seen in roentgen examination of the upper gastrointestinal tract.

Romberg's sign was present. When smog forced the patient to keep her eyes closed, she could not stand or walk. When fluoroscopy was being done for the upper gastrointestinal roentgen examination, the patient needed support to keep from falling.

Five weeks after the beginning of illness, irritation of the right sciatic nerve developed after the patient had sat in a hard chair in a cramped position. This lasted two days. Strength returned very slowly. Three months after the onset of illness the patient could walk only a dozen steps. Pain persisted in the back and legs. Sensation slowly became normal. Edema of the legs, as seen in other paralytic conditions of the lower extremity, became troublesome. Four months after onset the patient moved to another city where she was admitted to a county hospital (because of a condition not related to the illness here reported) and there she received rigorous physiotherapy, first as an in-patient and then as an out-patient. At the time of latest verbal communication with the patient, ten months after the onset of the symptoms here described, she told of remaining weakness.

CASE 5. The patient, an 11-year-old daughter of an anesthetist, in May of 1956, while receiving posture correction exercises was noted to have specific muscular weaknesses. Questioning disclosed an episode of "flu" and frequent episodes of upper respiratory tract infection during the winter, but no real history of dizziness. On examination weakness bilaterally of the deltoids, biceps and triceps as well as the hip flexors and of the external rotators of the right foot was observed. An electromyogram done on the left leg, the only limb tested, showed denervation fibrillations.

CASE 6. The patient, a 10-year-old girl, was first seen in early June with slight fever and malaise. Four days previously, dizziness and aching pains and weakness in the legs had developed. Upon examination, weakness of both the hip flexors and the left internal rotators was noted. Hyperesthesia of the anterior aspect of both thighs was followed by hypesthesia. By the end of two weeks strength and sensation had returned to normal.

CASE 7. A 24-year-old medical secretary in the rehabilitation department of the hospital was admitted to the hospital June 11, 1956, after a fainting episode. She had had fever, cough, malaise, sore throat with laryngitis and dizziness for the three preceding days. Pronounced bilateral weakness of the deltoid muscles, biceps and triceps, and of the hip and knee flexors and extensors was observed. There was hyperesthesia of the lower extremities and in the arms. Romberg's sign was present. Headache and dizziness lasted a week. A substernal pain [similar to the pain in Case 4] developed. Ingestion of antacids did not relieve it. It abated after a few days. During convalescence, signs of sciatic nerve irritation developed and lasted two days. Recovery was slow, requiring rest in bed and absence from work. When last observed, eight weeks after the onset of illness, the patient had slight shoulder weakness and decided hip weakness, although less than previously.

CASE 8. In July a 65-year-old woman had fever, nausea, a lightheaded dizzy feeling, headache and pains in the legs and hips. When the patient was first examined two weeks later, there was weakness of the hip, knee and ankle flexors and extensors bilaterally. The muscles gradually returned to normal over a period of six weeks.

CASE 9. In late June a 12-year-old girl complained of malaise, generalized weakness, dizziness and intermittent epigastric pain with anorexia of a week's

duration and fever for one day. She had one plus bilateral hip flexor weakness with hyperesthesia of the left calf. The changes lasted three weeks.

CASE 10. A 21-year-old woman was examined three days after onset of sore throat, chilliness, fever, headache and dizziness. The tonsils were enlarged and covered with purulent exudate, and the uvula and palate were edematous and red. There was two plus weakness of the right deltoid muscle and one plus weakness of the right biceps and of the hip flexors bilaterally. Slight hyperesthesia of the lateral side of the right calf was noted. Within a week motor and sensory abnormalities had cleared. A heterophil agglutination test done ten days after onset gave positive reaction in dilution of 1:224.

CASE 11. A 24-year-old woman was seen in June with fever, dizziness and slight weakness of the right deltoid. This cleared in two weeks.

New cases were not seen after early July although every patient with a clinical picture suggesting an acute infectious process was carefully screened with motor and sensory examinations.

It was not until May 29, 1957, that the next case was seen. In the ensuing month two more cases were found.

THREE CASES IN 1957

CASE 12. A 31-year-old housewife was well until sudden onset of headache, sore throat, fever, weakness, a shaking chill and dizziness. Seven hours after symptoms began she was examined by a physician. She then had general aching of muscles so severe as to require 100 mg. of Demerol (meperidine hydrochloride) for relief. A feeling of numbness followed, greatest in the arms and legs. The patient was put in hospital and when she was examined there she appeared acutely ill. The temperature was 102° F. The throat was reddened. Generalized hyperesthesia and apparent weakness in the limbs were noted. Reflexes were active. By the next day, hyperesthesia had disappeared. There was three plus weakness of the flexors, extensors and rotators of the left hip and two plus weakness of the right hip. Reflexes were depressed. The result of a heterophil agglutination test was negative. A stool culture, done because of some diarrhea, showed salmonella muenchen and agglutination studies for salmonella showed a 1:40 titer in the Kauffmann-White C1-C2 group. However, the patient's daughter was found to have the same organism in her stool. The patient was regarded as a carrier and the organism was not felt to be causative. The spinal fluid pressure and the content of the fluid were within normal limits. An electromyogram showed changes compatible with peripheral neuritis, even in muscle groups which seemed clinically uninvolved. Headache lasted three days. As in two cases previously described, lower sternal pain developed; it lasted two days. Over the next six weeks the strength of muscles gradually returned to normal, and an electromyogram showed commensurate improvement.

CASE 13. In May, a 25-year-old woman had chilliness, fever and severe headache for several days and dizziness which persisted for a week. In the three weeks ensuing she had aching in the legs, weakness and continuing fever. When the patient was first examined by the author three and one half weeks after onset, there was two plus weakness of the left hip flexor and slightly less weakness of the internal rotators. On the right the weakness was somewhat less. An electromyogram was compatible with peripheral neuritis. Six weeks after onset of illness, strength was almost normal.

CASE 14. On June 25 a 39-year-old woman had sudden onset of sore throat, headache, fever, dizziness and muscular aches. Weakness of the hip flexors, extensors and rotators, and of the knee extensors and flexors, greater on the right than left, was noted, and there was also hyperesthesia of the left thigh and calf. Improvement was noted in the 17 days the patient was observed up to the time of this report.

DISCUSSION OF CASES

The age range of patients was 10 to 65 years. Only one of the 14 patients was a man. Thirteen had a definite history suggestive of acute infection. Twelve had dizziness and aching muscles. All had motor changes, five of them in both the arms and legs, two in the arms alone, seven in the legs alone; symmetry of motor involvement was present in the arms in three cases and the legs in 12. In nine cases definite sensory changes were noted. Three patients had a lower sternal pain which was felt to be neuralgic. In three cases signs of sciatic nerve irritation developed; this reflected the hypersensitivity and increased irritability of the nerve. Electromyograms were made in seven cases and all were confirmatory of neuritis. Heterophil agglutination tests were done in seven cases; in only one was the reaction positive. Lumbar puncture was done in four cases; no abnormality was noted in any of them.

As was noted, 13 of the 14 patients were female. The case of the man was the only one in which there was not a history strongly suggestive of infection, and possibly the disease in that instance was traumatic radiculitis, rather than infectious neuritis. During the period covered many male patients with various acute infections were seen, some definitely fitting the pattern of headache, fever, and dizziness; yet none of them had muscle weakness.

Reflexes were normal or depressed.

Proximal muscle groups were consistently affected more frequently and more severely than distal groups.

The two most severely affected patients (Cases 4 and 7, 1956) had Romberg's sign. It is believed this did not indicate posterior column disease but, rather, involvement of proprioceptive nerves.

DIAGNOSIS

Important factors in clinically establishing the diagnosis and in differentiating it from poliomyelitis are:

1. Motor weakness which involves nerves derived from adjacent neurotomes rather than involvement of several neurotomes in a spotty fashion.

2. Definite sensory changes, which are neither spotty nor very transient, such as may be observed (but usually are not) in poliomyelitis.

3. Symmetry of pattern.

4. Antecedent or concomitant infectious state.

5. Other symptoms—such as headache, dizziness and muscle aches—which fit the syndrome.

6. Kernig's and Brudzinski's signs not present, and no nuchal rigidity.

Results of laboratory studies further clarify the diagnosis—no abnormality of the spinal fluid examination, and an electromyogram showing polyphasic motor units and denervation fibrillations.

Since the patient seldom complains of specific weakness, the diagnosis may be overlooked unless the physician has an awareness of the condition and carries out routine testing of muscle strength and of sensation in each patient with history of infectious disease. If weakness is found, other studies can be carried out.

ETIOLOGY

No attempt has been made to determine the causative organism. The fact that in three of the cases observed in 1956 (Cases 1, 2 and 7) the patients worked in the same department suggests it is of contagious nature.

A relationship to infectious mononucleosis is suggested because of the similarity in the clinical course in Case 10 (1956), in which there was positive reaction to heterophil agglutination test, with the other cases. Guillain-Barre's syndrome is unlikely for the results of spinal fluid examination were within normal limits. The Coxsackie virus certainly has to be considered among the possibilities, especially since the polyneuritis occurred during poliomyelitis season, when the Coxsackie virus is also prevalent.

In a review of recent literature no report was found of similar cases in this country. However, Macrae and Galpine[1] reported 13 cases (amongst 49 nurses) of an "illness resembling poliomyelitis" in a Coventry hospital. The clinical features, beginning with an acute infection leading to weakness and sensory changes, were similar to those in the series herein reported. Results of laboratory, spinal fluid and electromyographic studies were also similar. Studies done by Macrae and Galpine on the stool, as well as additional studies for leptospiral infection, lymphocytic choriomeningitis, poliomyelitis and other virus infections, failed to detect the etiologic agent. In the Coventry series all the patients were females. It can be postulated that the two illnesses bear a close kinship.

TREATMENT

Therapy is nonspecific, being that used in most neuritides—multivitamins orally and parenterally, thiamine chloride 100 mg. three times daily, and vitamin B_{12}, 1000 mcg. daily at first and then two or three times weekly. Rest in bed was maintained while the weakness was progressive. Gradual ambulation and physiotherapy were employed as strength increased.

PROGNOSIS

The rate of recovery seems to be in proportion to the degree of severity. Mild cases cleared in two weeks, moderately involved cases in a few months. In the two most severe cases, unfortunately, the patients moved away and close contact was lost. But progress in these two was much slower than in the less severe cases, in which improvement began usually in less than a week and proceeded steadily. In the severe cases (Cases 4 and 6, 1956) it was several weeks before signs of improvement were noted, and then return to normal progressed very slowly. In these two there was prolonged disability requiring rest in bed for many weeks.

The sensory changes clear up faster than the motor.

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ADDENDUM

After this paper was submitted, three more cases were observed. All the patients were women between 20 and 30 years of age. The clinical course was similar to that noted in moderately involved cases.

REFERENCE

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CASE REPORTS

Partial Duodenal Obstruction Secondary To Annular Pancreas

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ANNULAR PANCREAS is an infrequent developmental anomaly that usually causes clinical symptoms by bringing about duodenal obstruction of varying degree. The anomaly was described by Tiedman in 1818 and first named by Ecker in 1862.[4] More than 90 cases of annular pancreas, 60 treated surgically, have been reported.[1,2]

The development of the pancreas is often accompanied by ectopic pancreatic tissue in the stomach and duodenum. The organ develops from two anlagen, dorsal and ventral. The dorsal anlage, arising from that portion of the gut just proximal to the common bile duct, forms a portion of the head, body and tail of the pancreas. The ventral anlage is divided into two buds, right and left; the latter atrophies while the right persists. As intestinal rotation and development progresses the ventral anlage fuses with the dorsal, forming the head of the pancreas and enveloping the second part of the duodenum. The duct of Wirsung is composed of the union of the duct systems of both anlagen in the head of the pancreas. According to Bovill and co-workers,[2] in annular pancreas the left ventral anlage persists and remains fixed to the anterior portion of the duodenum and thus encircles as the migration of the pancreas takes place. Lecco[7] thought the cause to be adherence of the right ventral anlage to the wall of the duodenum and that an annulus was formed by dorsal rotation. The embryological aspects of the anomaly have been thoroughly discussed by other investigators also.[3,10] One of the practical aspects of the embryological development is that the pancreatic annulus often contains a duct and is sometimes so adherent to the wall of the duodenum that separation is not feasible. Perhaps this explains the abandonment of direct resection of the pancreatic ring as a method of treatment.

The symptoms in general depend on the degree of duodenal obstruction. As Ravitch and Woods[10] stressed, this anomaly usually does not cause symptoms until late in life. Obviously if obstruction is complete or if the ampulla of Vater is involved, symptoms are present in the first days of life.[5]

Diagnosis also depends in most part on severity of obstruction. A roentgenographic characteristic is the "double bubble" caused by dilatation of the duodenum and stomach proximal to the lesion. A history of recurrent attacks of nausea and vomiting and of intolerance for solid food since childhood should arouse suspicion of annular pancreas.

REPORT OF A CASE

A nine-year-old white girl was examined because of vomiting, nausea, poor appetite and rather peculiar selective habits as to diet. Foods such as corn, peas, dry beans, plums and peaches were avoided because they would cause her to vomit within a half hour to two hours after ingestion. She was the fourth child in a family of six. Over the years the patient's mother had come to think of her as an emotional and sensitive child, especially because of frequent vomiting, which sometimes occurred when the child became upset by what seemed insignificant things. The first episode of severe vomiting occurred when the patient was one year of age. She was admitted to a hospital with pronounced dehydration and debility due to vomiting for several days. She responded to administration of fluids by vein and was discharged improved. Vomiting thereafter was not severe or of long duration until the present attack, which had been preceded by frequent infections of the upper respiratory tract, including tonsillitis. Vomiting following every meal had begun after she had had a cold for five days.

The patient was fairly well developed and well nourished but rather small compared with the rate of growth and development of siblings. Her height was 50 inches and weight 55 pounds. The temperature was 98.6°F., the pulse rate 78. No pathological conditions were noted on examination of the scalp, skull, eyes and ears. Pronounced congestion of the nasal mucosa and hyperemia of the pharynx were observed. The tonsils were large. A few cervical nodes were palpable. The thyroid gland could not be felt. No abnormalities of the lungs or heart were noted. Moderate tenderness was elicited by deep palpation over the epigastrium, slightly more on the right side. No masses or enlargements of organs were noted. Reflexes were within normal limits.

Antispasmodics, sedatives and antibiotics were given and the upper respiratory tract infection was greatly improved but vomiting continued after the

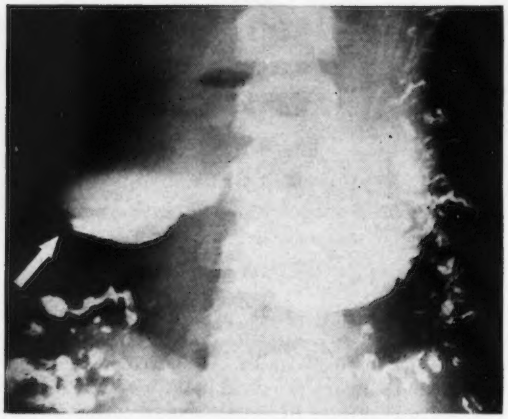

Figure 1.—Partially filled stomach. The coin (arrow) which later turned out to be two pennies apparently glued together by mucus, is shown lying in the viscus (a dilated segment of duodenum).

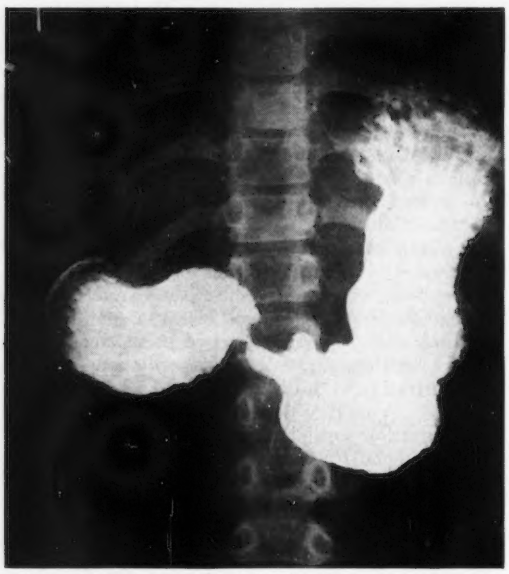

Figure 2.—Hypertrophied duodenal mucosal pattern resembling gastric rugal folds.

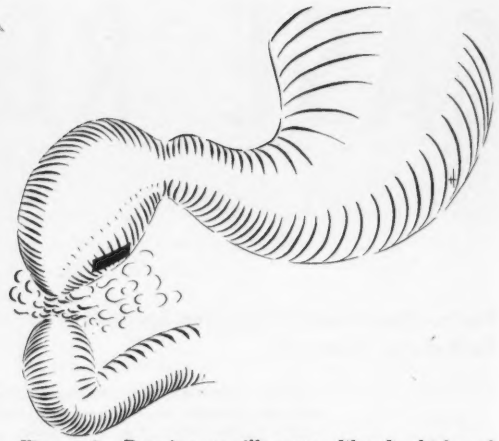

Figure 3.—Drawing to illustrate dilated, thickened, edematous duodenum with a constriction formed by pancreatic tissue distal to the ampulla of Vater.

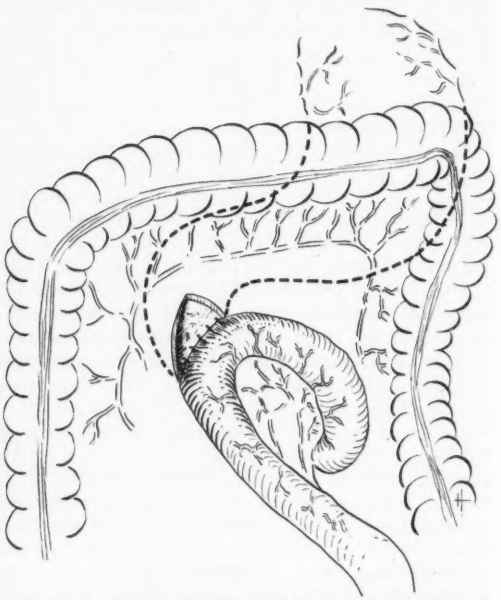

Figure 4.—Retrocolic duodenojejunostomy as done in the present case by anastomosis of the duodenum and the jejunum.

second day of treatment and the patient was put in the hospital. She was fed parenterally only and the vomiting subsided 36 hours after admission. After vomiting stopped, complete gastrointestinal x-ray studies were made. On fluoroscopic examination the heart and lungs appeared normal. Barium passed through the esophagus in the usual manner. The stomach filled completely, but the barium spouted through the pylorus and entered a viscus that appeared to be about half the size of the stomach. The viscus lay slightly above the lower level of the stomach and to the right of it. In it was seen what appeared to be a coin. The mucosa of the viscus resembled that of the stomach. Mobility, motility, pliability and mucosal pattern of the stomach looked normal. The duodenal bulb could not be identified. Roentgen films bore out the fluoroscopic observations and showed a dilated segment of duodenum distal to the pylorus. The previously noted coin-like object lay in the dilated segment. Slow passage of the barium indicated obstruction of the duodenum. (In three hours only a small portion of the barium left the viscus, most of it remaining in the dilated segment of the stomach.) A study with barium enema also was done, and save for the presence of a coin lying above the hepatic flexure, no abnormality was observed.

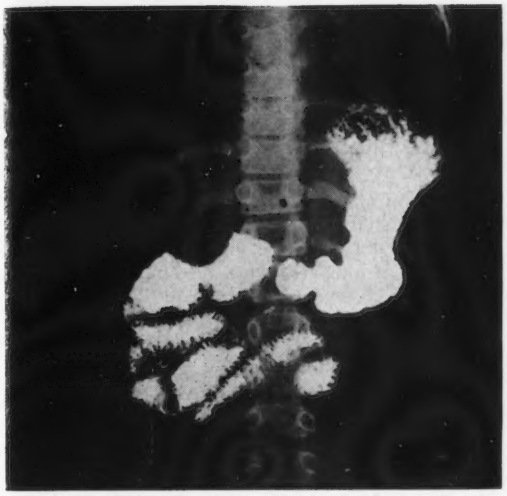

Figure 5.—The stomach appearing somewhat smaller five months after operation, showing the irregularity of the pylorus and duodenal bulb with the still remaining slightly dilated segment of duodenum.

At operation the duodenum was observed to be dilated, thickened and edematous, with a constriction formed by pancreatic tissue distal to the ampulla of Vater. No other intestinal abnormalities were discernible. Two pennies stuck together were in the duodenum proximal to the incomplete obstruction; they did not contribute to the obstruction. Retrocolic duodenojejunostomy, with anastomosis of the proximal duodenum to the jejunum, was carried out. Liquid feedings were begun two days after operation and the patient was discharged on the fifth day.

At home, without her parents' knowing, she ate jelly beans and other candy and drank large amounts of liquids. Vomiting followed. The parents at first were not alarmed, ascribing the vomiting to emotional distress since supposedly the operation had corrected the organic cause. Three days after being discharged the patient was readmitted because of lethargy, dehydration and carpal-pedal spasm. The diagnosis was hypochloremic alkalosis. The carbon dioxide content of the blood was 34 mEq. per liter and serum chlorides 58 mEq. per liter. Total protein content, the albumin-globulin ratio, serum calcium and potassium and a hemogram determination were within normal range. Roentgen examination of the abdomen showed an isolated loop of jejunum which was believed to be proximal to the anastomotic junction. Nasogastric suction was begun and 0.75 per cent ammonium chloride and 5.0 per cent sodium chloride solutions were given parenterally. Within 24 hours the patient became more alert, serum chlorides and carbon dioxide contents were within normal range and an x-ray film of the abdomen no longer showed the isolated dilated loop of jejunum. Oral feedings were begun in 48 hours and were well tolerated. The patient was discharged after seven days and was asymptomatic thereafter. About five months later roentgenographic study of the upper gastrointestinal tract was carried out and the stomach was observed as essentially normal and the second portion of the duodenum as slightly dilated. There was no obstruction to passage of barium. Nine months after operation the patient's height was 52 inches and her weight 71 pounds.

DISCUSSION

Although the child in the present case had a history of having avoided eating corn, beans and pulp fruits because of vomiting immediately after ingestion of them, nonetheless annular pancreas existed for eight years without thorough investigation. The characteristic "double bubble" sign was not shown in a plain x-ray film of the abdomen. Barium studies were necessary for accurate diagnosis. It would seem advisable, in the case of a child with recurrent episodes of vomiting accompanied by developmental retardation, asthenic habitus and emotional instability, that the cause of the emesis be fully ascertained.[2] Perhaps in the present case postoperative vomiting could have been avoided by (1) waiting until the acute episode was fully abated before doing the operation, since obstruction was not complete, and (2) keeping the patient under dietary supervision in the hospital for several weeks.

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Carcinoma of the Stomach in Young Adults

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CARCINOMA OF THE STOMACH is not limited to the later years of life, and general recognition of this fact could lead to some lowering of the rate of mortality from the disease. Two cases of gastric carcinoma in young adults are illustrative, and although

From Eden Hospital, Castro Valley.
Submitted March 21, 1957.

there were some clinical similarities, the two were entirely different as to type of carcinoma and the secondary lesions. Both patients were in the hospital at the same time and died within a week of each other.

CASE 1. A 23-year-old man was admitted to the hospital with complaint of mild generalized abdominal pain which had begun on the afternoon of the preceding day. He was slightly nauseated and had vomited once.

He had been well until ten months previously when there had been an episode of sudden pain in the abdomen so severe that it "doubled him up." There had been no nausea nor vomiting at that time and no tarry stools were passed. He had been put in hospital but was completely free of symptoms within 24 hours, and was discharged from the hospital without a definitive diagnosis. There had been a similar episode three months later; and a month before the present admittance the patient had noted dull pain in the back and flanks for a few days.

Upon physical examination the patient was observed to be well developed and well nourished. There was no evidence of recent loss of weight. The abdomen was soft and a 3 cm. nodular mass was palpable at the lower border of the right lobe of the liver. Results of examination of the blood and urine were within normal limits. A serologic test for syphilis was negative. Analysis of gastric fluid showed total acidity of 56 units, but no free acid, a guaiac reaction positive for hemoglobin, and a negative reaction for bile. Roentgenograms with a barium meal showed a filling defect of the antrum of the stomach, with ulceration of the mucosa of the greater curvature. About 50 per cent of the barium remained in the stomach at the end of six hours. No lesions were observed in urograms, in films of the chest or in studies with barium enema. Because of the lesion of the liver, the gastric lesion was considered inoperable.

During the first two months in the hospital, the weight of the patient decreased 20 pounds. The temperature was sometimes normal but usually it was 100° F. to 102° F. He became jaundiced and the icterus index varied between 19 and 40 units for the remainder of his life. Urobilinogen was present in the urine in a dilution of 1 to 200. The stool contained no bile nor urobilinogen but contained large amounts of occult blood. The erythrocyte content decreased to 3,200,000 per cu. mm. of blood and the hemoglobin content to 7 gm. per 100 cc. The patient was unable to retain much food during the fifth and sixth months in the hospital, and jejunostomy was done. The surgeon noted a hard mass in the pyloric portion of the stomach and an enlarged lymph node in the lesser curvature. The patient became progressively weaker after the operation and had intermittent irregular fever as high as 102° F. Seven and a half months after admittance he died.

Autopsy

The body was emaciated, and there was generalized icterus. The jejunostoma was patent. There was a recent thrombus in a medium-sized artery in the upper lobe of the left lung associated with a red infarct 4.0 cm. in diameter. The tissues of the porta hepatis were composed chiefly of metastatic tumor and enlarged lymph nodes. The tumor constricted the common bile duct, the portal vein, and the hepatic artery in the lower portion of the porta hepatis, and there was partial replacement of the walls of the common bile duct and portal vein by tumor tissue immediately below the level of the junction of the hepatic ducts. In the lining of the portal vein there was an ulcerated area 1.0 cm. long, and the common duct was ulcerated and completely occluded by tumor in an area of similar length. Tumor tissue extended around the cystic duct and infiltrated the wall of the gallbladder.

The liver weighed 2,500 gm. and contained many subcapsular and intrahepatic abscesses which were up to 3.0 cm. in diameter. These contained thick yellow pus. Approximately one-third of the entire liver substance was occupied by abscesses. The walls of some were thick and fibrous while others had no walls except for necrotic liver tissue.

A few of the lymph nodes in the region of the head of the pancreas were enlarged and had grayish white glassy cut surfaces. The pancreas was normal, as were the remaining abdominal viscera with the exception of the stomach.

The fundus of the stomach was slightly dilated. An annular ulcerated carcinoma with rounded firm edges was observed in the antral region. The area involved by tumor was 5.0 cm. long and its distal edge was at the pylorus. The thickness of the stomach wall in the region of the tumor was 1.0 to 1.5 cm. The tumor was composed of glassy gray tissue in which there were occasional areas of yellow necrotic tissue up to 0.2 cm. in diameter. The lumen was extremely narrow in the region of the tumor.

Upon microscopic examination the tumor of the stomach was observed to be a moderately well-differentiated adenocarcinoma. Masses of tumor cells extended through the wall of the stomach into the subserosa and into the smooth muscle of the pyloric sphincter. Many of the cells contained secretory vacuoles and within the lumens of some of the imperfect glands were masses of debris. The vacuoles and debris stained bright pink with mucicarmine.

The lymph nodes of the lesser curvature, the porta hepatis and around the head of the pancreas were filled with tumor which formed imperfect glands and large quantities of mucin (Figure 1). Similar tumor was present in the areolar tissues of the porta hepatis and tumor invaded through the walls of the portal vein and the common bile duct.

Neoplasm was not observed in the liver although many sections were examined. Fibrous tissue surrounded some of the abscesses, but others had practically no peripheral fibrous tissue. The cavities of the latter were bounded only by a zone of necrotic liver parenchyma.

The cause of death was mucus-producing adenocarcinoma of the pyloric portion of the stomach,

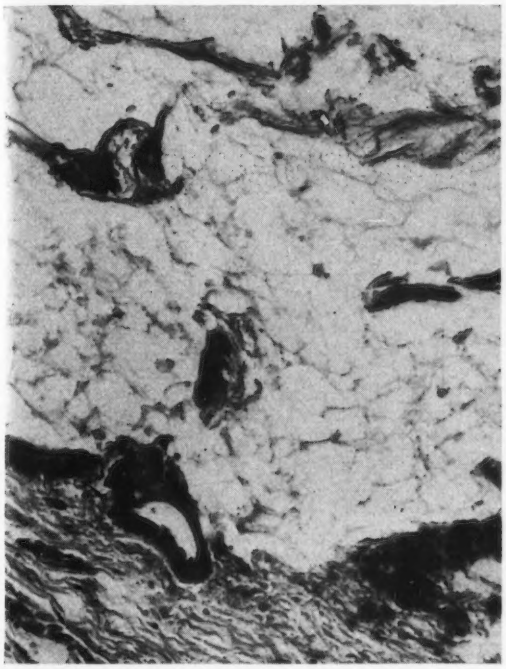

Figure 1 (Case 1).—A portion of a lymph node from the porta hepatis. Abundant mucin, and a small acinus in the capsule of the node. (Hematoxylin-eosin stained, ×185.)

with metastasis to the regional lymph nodes and to the areolar tissues of the porta hepatis, with extension from the latter into the wall of the gallbladder, the common bile duct (causing complete obstruction), and the portal vein (causing partial obstruction). In addition, there were multiple abscesses of the liver, thrombosis of an intrinsic branch of the left pulmonary artery with infarction of lung tissue, and generalized obstructive icterus.

It is believed that the nodular mass which was palpable in the liver at the time the patient was admitted to the hospital was one of the hepatic abscesses observed at autopsy. The hepatic abscesses presumably resulted from dissemination of organisms into the liver, via the portal vein, from the ulcerated infected neoplasm of the stomach.

Case 2. A 31-year-old white man was admitted to the hospital with complaint of pain in the flanks which caused him to maintain a stooped posture. He had been well until six weeks before, when a dull pain developed in the left flank as he lifted a heavy box. This pain became progressively more severe, and for two weeks before admittance he had had pain in the right flank also. The patient had to strain considerably to pass urine but there were no other urinary symptoms.

The patient appeared well nourished. The abdomen was flat and no masses could be felt in it. There was tenderness in both flanks on deep pressure. The prostate was large, firm and tender. No abnormalities were noted on examination of the blood and urine. The diagnosis was prostatitis.

Sitz baths and sulfadiazine were prescribed and after ten days the difficulty in urination was considerably less. Pain in the back persisted in spite of daily administration of Dilaudid® (dihydromorphinone) and scopalamine. Ectasia of the calyces of both kidneys and sharp kinking of the left ureter at its junction with the pelvis of the kidney were observed in retrograde urograms.

Three weeks after admittance a firm mass 2.0 cm. in diameter was noted in the right inguinal region, and an irregular, firm nontender mass was felt in the scrotum. A week later a similar mass was noted in the suprapubic region. Two months after admittance, sigmoid colostomy was performed for chronic rectal obstruction, and an appendix epiploica from the sigmoid colon was found to contain cells of a poorly differentiated carcinoma.

After the operation, the patient had episodic diarrhea and vomiting. Bilateral ankle edema and ascites developed. The patient became gradually weaker, and died four and a half months after admittance.

The clinical diagnosis was carcinoma of the prostate with metastasis to the scrotum, right inguinal lymph nodes and rectum.

Autopsy

The body was emaciated. In the dermis of the lower edge of the larynx was a flat nodule 2.0 cm. in diameter. A double-barrel colostomy opened on the left lower quadrant of the abdomen. There was a poorly defined tumor in the abdominal wall extending up from behind the pubic symphysis, and similar tumor was palpable in the skin of the perianal region and the perineum. The latter was contiguous with tumor which extended into the tissues of the scrotum. Upon digital examination of the rectum woody hardness of the tissue surrounding the anus and rectum was noted. The lumen of the rectum was decidedly narrowed.

Firm retroperitoneal tissue extended along both sides of the abdominal aorta and in the mesenteries of the small intestine and sigmoid colon. This firm tissue extended down into the pelvic fascia and into the connective tissue surrounding the rectum and the neck of the bladder.

The porta hepatis was thickened and indurated. The wall of the gallbladder was diffusely thickened by firm invading tumor tissue.

Section into the tumor revealed it to consist of glassy, moist, gray tissue in which were scattered a few pin-point pale yellow areas.

No abnormalities were observed in the liver, pancreas or spleen. The capsules of the adrenal glands were invaded by tumor but there was no encroachment upon the parenchyma. The capsules of the kidneys were likewise invaded by tumor which extended into the renal sinuses and surrounded the renal vessels.

The retroperitoneal tumor completely surrounded

and narrowed the ureters from the ureteropelvic junction to the bladder but these structures were not invaded by neoplasm. The mass noted externally above the pubic symphysis was contiguous with invasive tumor of the wall of the urinary bladder.

Retroperitoneal tumor tissue was contiguous with the capsule of the prostate but did not invade the gland, and the prostate itself appeared normal. Tumor extended to the tissues of the perineum, and thence it extended into the scrotum where it invaded the left epididymis.

The stomach was small, of linitis plastica type, and the wall was diffusely thickened. There was a sharply punched-out ulcer 1.5 cm. in diameter in the mucosa of the greater curvature, 5.0 cm. distal to the cardia. There were four other small shallow ulcers of the greater curvature. The thickening of the stomach wall was due to infiltration of dense white tissue into the submucosa, and in some places there was slight similar infiltration in the connective tissues of the mucosa. Tumor tissue contiguous with that in the wall of the stomach extended into the tissues of the subserosa of the diaphragm, and, through the latter, was contiguous with the tumor in the left flank. Neoplastic tissue also extended around the pylorus to become contiguous with that of the right flank and the porta hepatis. The lower portion of the sigmoid colon was invested by dense tumor which was principally in the submucosa and subserosa. This tumor extended downward to form a collar of tumor tissue about the rectum.

Upon microscopic examination of the stomach the submucosa was observed to be diffusely infiltrated with connective tissue of collagenous type which in some places extended into the muscular wall and subserosa. Tumor cells were present in this connective tissue and they were grouped in small, irregular masses that occasionally formed imperfect rosettes which poorly simulated glands. The tumor cells were composed of slightly eosinophilic cytoplasm in small to moderate quantities which in many of the cells had an opalescent appearance similar to that of the parietal cells of the gastric glands. The nuclei tended to be eccentric within the cells and frequently were in contact with the cell membrane at one place. In this respect they also resembled the parietal cells of the gastric glands. None of the cells contained vacuoles, and stains for mucin showed none present. Moderate numbers of mitotic figures were noted.

A cross section of tissue from the right flank revealed tumor completely surrounding many of the nerve trunks, and the perineural lymphatic vessels were nearly all filled with tumor cells. The tumor in the flank consisted chiefly of dense fibrous tissue in which were occasional masses of neoplastic epithelial cells. Many of the latter appeared to be undergoing degenerative changes (Figure 2). In sections of several periaortic lymph nodes, a few areas in which there were small growths of tumor cells were observed. Although large numbers of tumor cells were present in the sinuses of some of the nodes, there was no apparent growth of most of these cells

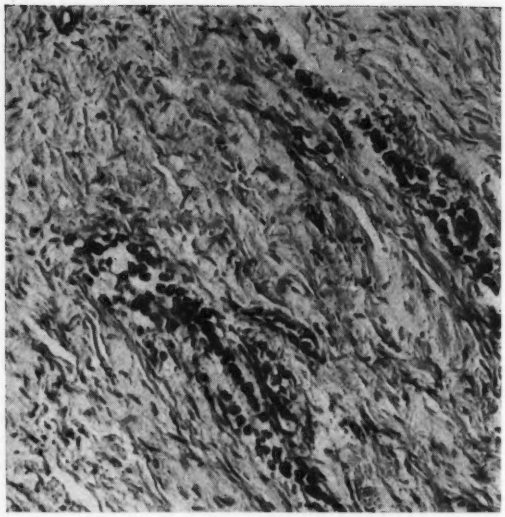

Figure 2 (Case 2).—Retroperitoneal tissue from right flank. Dense collagenous tissue, and lymphatics containing tumor cells. (Hematoxylin-eosin stained, ×114.)

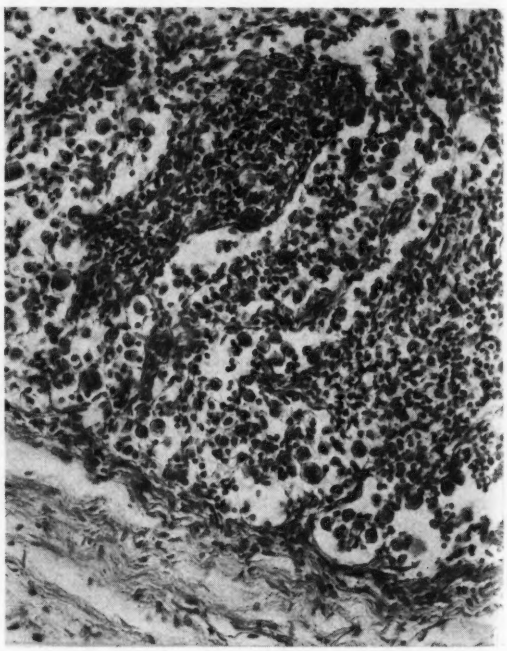

Figure 3 (Case 2).—Section of lymph node showing tumor cells in the sinuses. (Hematoxylin-eosin stained, ×235.)

in the nodes (Figure 3). The tumor surrounding the rectum and sigmoid colon was found to be principally in the subserosa with focal extensions into the connective tissue between the external and internal layers of muscle and into the submucosa; and the wall of the urinary bladder was diffusely infiltrated

with masses of fibrous tissue in which there were nests of tumor cells.

The cause of death was scirrhous carcinoma of the stomach, with extension to the retroperitoneal tissues and stenosis of the ureters, extension to the perirectal tissues with stenosis of rectum, and to the perineum, scrotum, wall of urinary bladder, mesentery of the small intestine, porta hepatis, gallbladder, and capsules of the pancreas, adrenal glands, kidneys and prostate. There was also metastasis to periaortic lymph nodes and to the skin of the neck.

DISCUSSION

In a study of a series of 1,913 cases of carcinoma of the stomach, Block, Griep and Pollard[1] noted that only 1.04 per cent of the patients were younger than 30 years. The importance of recognizing that this disease may occur in young adults is illustrated by the two cases of inoperable carcinoma described herein.

Fatal delay in diagnosis and surgical therapy of gastric carcinoma in relatively young persons sometimes results from failure of physicians to accept evidence of neoplasm because of the patients' age. The incidence of benign gastric ulcer in youth is much greater than that of malignant disease, and knowledge of this fact may delay recognition of the latter. However, the danger that any ulcer of the greater curvature of the stomach may be due to carcinoma is so great that all cases of ulceration of this region should be dealt with as though malignant unless other circumstances preclude such treatment or exclude that diagnosis.[6]

The difference in the centrifugal extensions of the tumors in the two cases herein presented is of interest. The medullary tumor had relatively little contiguous spread, but had metastasized by way of the lymphatic channels to the nodes of the lesser curvature of the stomach and to the tissues and nodes of the porta hepatis. The extensions of the scirrhous tumor were almost exclusively by contiguous spread rather than by embolic metastasis, and neoplastic tissue was present throughout the submucosa of the stomach and extended into the retroperitoneal tissues from the regions of the cardia and the pylorus. It passed downward to involve the capsules of the retroperitoneal organs and the fibrous sheath of the rectum and sigmoid, and had entered the perineum and scrotum through the fascial planes of the pelvis. There was invasion of the capsule of the prostate, and doubtless this caused the difficulty in urination which was so prominent as a first symptom.

Wherever the scirrhous tumor extended, some or all of the perineural lymphatic vessels contained tumor cells within their lumens. Many of the lymph nodes receiving these vessels contained tumor cells in their sinuses, but small foci of actively growing tumor were found only in some small nodes of the lesser curvature of the stomach and in a few of the retroperitoneal nodes. The only distant metastatic lesion was in the skin of the neck, where the scirrhous nature of the tumor was again manifested.

Scirrhous tumors and mixed carcinomas which contain scirrhous elements carry an especially bad prognosis,[3] and the earliest symptoms in the present case of scirrhous carcinoma were due to tumor which had spread to the retroperitoneal region. It is believed that such cases provide a clue to the origin of the fibrosing tendency of some gastric carcinomas. The cells are fairly well differentiated and have acidophilic cytoplasm and small nuclei resembling those of the parietal cells of the gastric glands. There is no apparent elaboration of mucus. It is known that the tissue reaction to excessively low pH is likely to be fibrosis. This has been demonstrated experimentally by subcutaneous injection of acid substances into animals.[2] It is reasonable to conclude that some scirrhous carcinomas of the stomach are derived from parietal cells and that the neoplastic cells retain an ability to secrete hydrochloric acid. The acid is believed to be responsible for the excessive production of collagen in these cases. The second case reported here is considered to be a tumor of this type. This origin of some scirrhous tumors of the stomach was postulated in 1905 by Hayem,[4] but it has never been accorded the recognition it seems to deserve.

Jaundice due to metastasis of malignant tumors to the common bile duct is unusual. Herbut and Watson[5] reported three instances of this condition, but noted that there had been no other cases described since 1924.

CONCLUSIONS

Carcinoma of the stomach is not limited to the later decades of life. In approximately 1 per cent of the cases the patient is less than 31 years of age.

Until it is generally accepted by physicians that carcinoma of the stomach does occur in young adults, diagnosis will be delayed in some cases in which the patient might otherwise be benefited or cured by surgical operation.

There is a great probability in any case that ulceration of the greater curvature of the stomach is due to neoplasm.

The premise that some scirrhous tumors of the stomach arise from parietal cells, and that their fibrosing tendency is the result of local diminution of pH resulting from secretion of hydrochloric acid by tumor cells, was supported by conditions observed in one of the cases herein presented.

Metastatic carcinoma involving the common bile duct and portal vein is recorded.

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Severe Recurrent Pancreatitis

A Recent Development in Treatment

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THE THEORY that severe recurrent pancreatitis is caused by pancreatic duct obstruction was encouraged by Priesel in 1922, when he noted partial ductal obstruction due to metaplasia of the epithelium. The work was subsequently corroborated by other investigators, in particular Rich and Duff.[5] It is held that increased pressure in the ductal system leads to rupture of the smaller radicals and extravasation of pancreatic juice into the parenchyma. Unlike experimental obstruction of the duct, clinical obstruction is gradual and incomplete. With the former, it is noted, there is rapid destruction of the acinar tissue and pancreatitis may not occur. The theory of pancreatic blockage as the basic etiologic factor is at least 50 years old but has only recently been emphasized as knowledge of the pathophysiology of pancreatitis has grown.

Upon examination of Warren's classification of the many surgical procedures that have been proposed for the operative management of pancreatitis, it becomes obvious that the vast majority of them are not concerned with treatment of the diseased organ itself; and of the few techniques that are directed at the pancreas *per se*, most make no provision for decompression of the gland—a primary requisite for the correction of the pathologic state.

In 1946, Cattell described the anastomosis of the duct of Wirsung to the upper jejunum in an attempt to relieve chronic pancreatitis. In 1954, Zollinger and DuVal[1] independently reported caudal pancreatectomy and pancreaticojejunostomy for pancreatic decompression. In an attempt to encourage the increased consideration of this operation, the following case is reported.

From the Department of Surgery, Cedars of Lebanon Hospital (Lichtenstein).

Presented before the Section on General Surgery at the 86th Annual Session of the California Medical Association, Los Angeles, April 28 to May 1, 1957.

REPORT OF A CASE

A 33-year-old white housewife was admitted to the private service at the Cedars of Lebanon Hospital with a diagnosis of penetrating peptic ulcer. Roentgen study a year previously, it was said, had showed an active duodenal ulcer.

Despite a rigid regime for treatment of ulcer, including anticholinergic drugs, the symptoms had progressed, and at the time of admittance to hospital considerable epigastric discomfort followed every meal. The severity of pain had increased greatly just before admittance. The patient said that for many years she had drunk a martini nightly before meals and occasionally became drunk over the weekend. She described her pain as epigastric in origin, radiating to the left upper quadrant and boring severely into the back.

Upon physical examination the patient was observed to be well developed but thin, with evidence of moderate loss of weight. The only significant abnormal finding was decided epigastric tenderness and guarding. There was no rigidity. Results of urinalysis, the urea nitrogen content of the blood and a fasting blood sugar determination were within normal limits. The serum amylase was 47 units and serum lipase was 210 units (normal range 60 to 150 units for both enzymes). The stool did not contain fat, but a few meat fibers were present.

In roentgenograms of the gastrointestinal tract no evidence of peptic ulcer was seen. Diffuse calcinosis

TABLE 1.—*Results of Preoperative Secretin and Urocholine Stimulation Studies*

	Blood		Duodenal Drainage			
	Amylase (Units per 100 cc.)	Lipase* (Units per 100 cc.)	Volume cc.	Amylase	Lipase	Bicarbonate mEq. per 100 cc.
Fasting 1½ hour	38	110	30	562	1400	0.4
After secretin intravenously:						
10 minutes	27	90	12	243	1500	0
20 minutes	<25	120	10	378	1400	0
40 minutes	25	140	12	404	1180	0
60 minutes	<25	150	13	270	850	0
Fasting 1½ hour	<25	130	8	404	750	0
After urocholine subcutaneously:						
10 minutes	<25	130	5	599	600	0
20 minutes	<25	120	0	....	....	....
40 minutes	<25	120	10	599	270	0
60 minutes	Test terminated with narcotics because of severity of induced attack of pancreatitis					

*Normal over 200 units per 100 cc.

Figure 1.—The arrow points to the two stones obstructing the duct of Wirsung. Calcinosis can be seen distal to this point, but the head of the pancreas does not appear to be involved. (Reproduced by permission of Gastroenterology.)

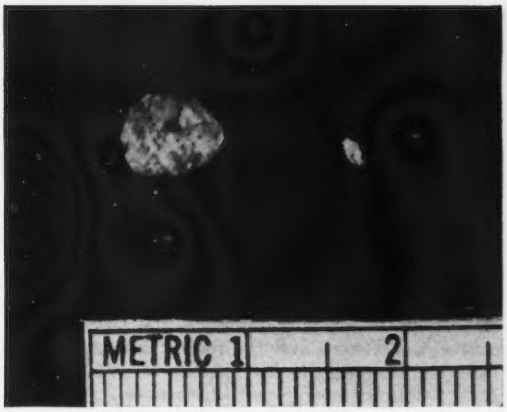

Figure 2.—The two stones shown by x-ray in Figure 1. Note that the larger is almost 7 mm. in diameter. (Reproduced by permission of Gastroenterology.)

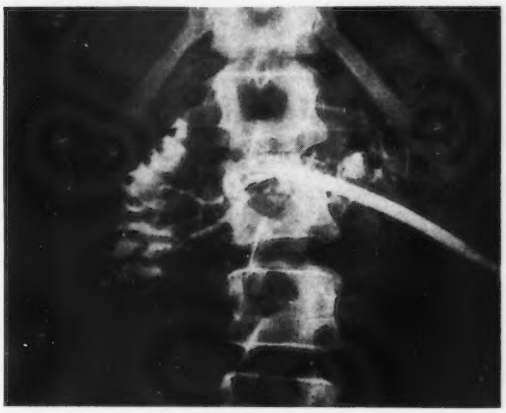

Figure 3.—The injection of Diodrast into the main duct, after removal of the stones and transection of approximately 60 per cent of the pancreas. The ducts of Wirsung and Santorini are clearly outlined and the dye flows easily, without pressure. (Reproduced by permission of Gastroenterology.)

of the pancreas, particularly the body and tail, was noted, however. Gallbladder function was normal without evidence of cholelithiasis.

It was reasoned from the foregoing that the patient had pancreatitis, and studies were done to establish the diagnosis. A glucose tolerance test was entirely within normal limits. The response of the pancreas to urecholine and secretin stimulation is shown in Table 1. It is evident that pancreatic function was considerably impaired even after intense hormonal and cholinergic stimulation. Both secretin and urecholine induced a severe attack of clinical pancreatitis. Operation was pondered to prevent the progressive complete destruction of an already decidedly diseased gland. Since it is estimated that diabetes will develop in 25 per cent of patients with pancreatic calcinosis and in light of the patient's urgent request for relief of pain and the threat of a life of dependence upon narcotics, operation was decided upon.

Under spinal anesthesia, a supraumbilical transverse incision was made and both rectus muscles were divided. No significant abnormalities except pancreatic disease were observed in the abdominal cavity. The stomach and duodenum were visibly and palpably normal, as was the entire biliary tree. The pancreas was nodular; many calcifications could be palpated throughout the gland. Caudal pancreatectomy, splenectomy and pancreaticojejunostomy were carried out in the following manner. The gastrocolic ligament was divided and the tail and body of the pancreas was mobilized and transected along with the spleen. The pancreatic duct as it emerged from the transected body of the gland was 6 mm. in diameter. By means of a scoop, two stones in the major duct were removed. The larger one was 7 mm. in its greatest diameter. These two stones, which were visible in the x-ray films, were probably the cause of the severe calcinosis in the distal portion of the gland. Diodrast, 35 per cent, was then injected into the duct. Clear passageway and easy egress into the duodenum through the duct of Santorini as well as the duct of Wirsung were shown (Figures 1, 2 and 3).

Intraductal pressure, after removal of the stones, was 90 mm. of water, and it did not rise with the intravenous administration of secretin. This was

anticipated inasmuch as the obstruction proximally had been removed. An end-to-end anastomosis was done between the remaining body of the pancreas and a defunctionalized loop of jejunum just distal to the ligament of Treitz. A Roux-en-Y technique was used, bringing a limb of the jejunum through the transverse mesocolon (Figure 4). The anastomotic seam was made of interrupted sutures uniting the mucosa of the main duct to that of the jejunum. The outer layer approximated the seromuscular coat of the bowel to the pancreatic capsule.

The patient did well through the procedure. Nasogastric suction was applied for 48 hours after operation. Except for mild diarrhea, the postoperative course was benign and the patient was discharged from the hospital on the eighth postoperative day. At the time of most recent observation, 18 months later, she was taking no medicine, was able to eat an unrestricted diet and to ingest alcohol, and she had no discomfort whatsoever after meals. She said she never had felt so well. That the result of operation was good was apparent within two weeks following the procedure. Subcutaneous administration of urecholine six days after operation did not induce even slight abdominal discomfort, despite a decided pharmacological effect of the drug (severe diaphoresis and urinary urgency); nor was there any increase of pancreatic ferments in the blood following this stimulation.

The following observations were made upon pathologic study of the resected specimen: Atrophic pancreatitis secondary to duct lithiasis, a calculus 0.7 cm. in diameter located in the main pancreatic duct and corresponding dilatation of the minor radicles of the ductal system containing calculi up to 0.2 cm. in diameter (Figure 5).

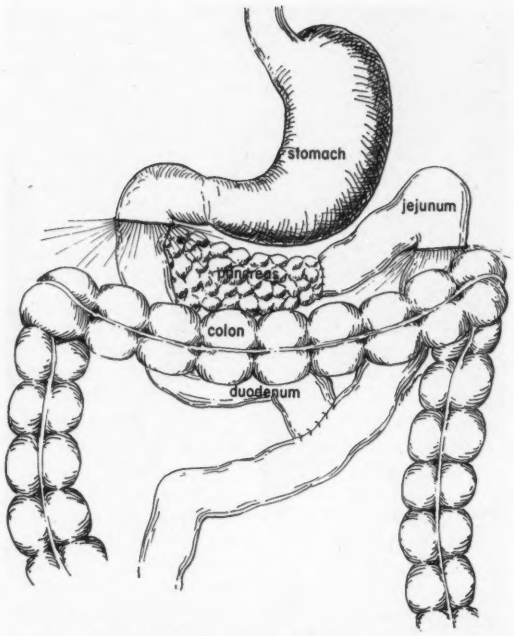

Figure 4.—Artist's concept of the operation described. Actually, more pancreas was removed than is herein depicted. (Reproduced by permission of Gastroenterology.)

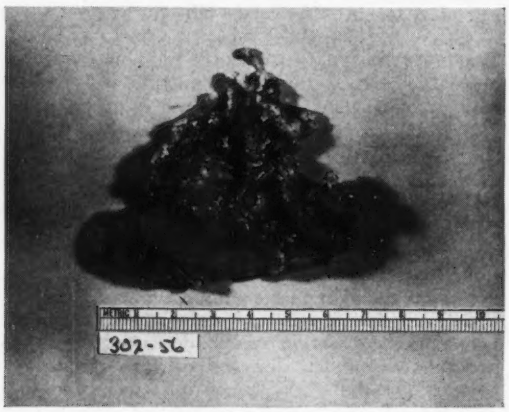

Figure 5.—The resected specimen of pancreas. Note the great dilatation of the main pancreatic duct.

DISCUSSION

Ivy[3] emphasized that spasm of the ampulla or a stone can mechanically obstruct the outflow of pancreatic juice and reflux of bile may not occur. Seldom can the accessory pancreatic duct help toward decompression, for in only about 15 per cent of persons is its communication with the duct of Wirsung wide enough.

Retrograde pancreatic drainage was first carried out by Coffey in 1909, in dogs. He reasoned that regardless of whether the cause was reflux or ductal obstruction, pancreatico-enterostomy should protect the gland. Sensenig[6] recently indicated quite clearly that caudal decompression of the gland did indeed protect the animal from the devastating effect of bile injection into the pancreatic duct.

As one reviews the tremendous mass of writings on this subject, he becomes more and more impressed that ductal obstruction may be the one common denominator in etiology. Increasing acceptance of this concept of elevated duct pressure may be found in modern literature: "Obstruction plays a very important role and may be a *sine qua non* in the genesis of most cases of pancreatitis" (Ivy)[2]; "It has been our central thesis that intrapancreatic obstruction, partial or complete, involving one or both of the major pancreatic ducts is the key to a rational approach to the surgical treatment of chronic pancreatitis" (Warren)[7]; "The anatomical evidence suggesting pancreatic duct obstruction as the etiological agent in the production of chronic pancreatitis would seem to be confirmed by clinical experience" (DuVal);[1] "No single etiologic factor . . . but in the majority of the cases, it is probably a partial or complete obstruction of the pancreatic ducts" (McDermott)[4].

DuVal[1] recently presented strong arguments in support of the obstructive theory. He noted the occurrence of pancreatitis precipitated by stimulation of secretion (by food, especially fats; by alcohol or other drugs; by emotional turbulence). He observed also that the pain of pancreatitis is frequently obstructive in nature and the progressive destruction of the gland with cystic change is certainly in keeping with repeated episodes of back-pressure. Most important, he repeated past investigations and confirmed that the administration of secretin and urecholine to a patient with pancreatitis ordinarily results in a subnormal duodenal output of the enzymes and bicarbonate despite normal biliary flow. This occurs in conjunction with elevation of serum amylase and lipase and frequently incites a clinical attack of pancreatitis.

DuVal suggested that certain criteria as evidence of pancreatic obstruction be met before a patient be subjected to operation, namely: "(1) elevation of serum amylase and lipase during an acute attack; (2) an abnormal quantity of undigested fecal fat on a measured fat intake (Schmidt diet); and (3) a diminished duodenal output of amylase, lipase and bicarbonate, after stimulation of the pancreas by secretin and urecholine." In addition to these criteria, at operation further proof of obstruction of pancreatic outflow is sought: "(4) on section of the pancreas at the junction of the body with the tail, the pancreatic duct should be dilated (normal is up to 2 mm.); (5) injections of radiopaque material into the pancreatic duct system, followed by roentgenographic examination, should not reveal egress of a dye into the duodenum; (6) stimulation of the pancreas by secretin should result in a rise in intraductal pressure well above the resting normal." Following decompressive operation, DuVal observed (with urecholine and secretin stimulation) decidedly decreased serum amylase and lipase levels as compared with the preoperative values, and distinctly elevated concentrations of pancreatic enzymes in the stool. This increased pancreatic output after operation can leave little doubt that obstruction was originally present.

In an attempt to assess the preoperative status of the pancreas in the patient reported upon herein, the following was performed. A Miller-Abbott tube was passed until bile was obtained. The tube was then taped in place and the presence of the metal tip at the duodenojejunal junction was confirmed roentgenographically. Nothing by mouth was permitted after dinner that night and a Levin tube was inserted through the other nostril in the morning. Suction was attached to both tubes through two separate machines. All blood specimens were tested for amylase and lipase. The specimens of duodenal secretin were evaluated for pH, bicarbonate, lipase, amylase and volume. Duodenal secretion was collected for an hour and a half before 55 units of secretin (Lilly) was injected intravenously (approximately 1 unit per kilogram of body weight). Blood specimens and duodenal juices were then collected at 10, 20, 40 and 60-minute intervals. Following a rest period, the test was repeated; this time 10 mg. of urecholine subcutaneously was substituted for the secretin. The results of these tests are tabulated in Table 1. While the concentration of enzymes in pancreatic juice ordinarily seems to be under the influence of vagal stimulation (urecholine), stimulation by secretin ordinarily results in a large volume of thin secretion containing much bicarbonate.

Analysis of Results

1. *Rate of secretion.* Despite the secretin stimulation, the total output from the pancreas in 1 hour was only 47 cc., or considerably less than 1 cc. per minute. With a normal pancreas the volume should range from 75 to 300 cc. per hour following such stimulation. Lopusniak[3] said, "It is tempting to suggest that the total volume of secretion may be a measure of the mass of functioning pancreatic cells."

2. *Bicarbonate concentration.* In normal patients following the injection of secretin the bicarbonate value rises rapidly. In this patient neither secretin nor urecholine stimulation caused the appearance of any appreciable amount of bicarbonate. (Once again, it has been suggested that when the volume and bicarbonate concentration are both depressed this may be some measure of functioning pancreatic acini.)

3. *Duodenal amylase and lipase concentration.* It will be noted that the duodenal enzymes in this patient were not increased under stimulation by secretin or urecholine. This might be expected if the theory of ductal obstruction is valid. Indeed, under urecholine stimulation (possibly increasing the obstructive element through spasm) the duodenal juice concentration of enzymes was decreased.

4. *Blood amylase and lipase.* The depressed amylase and lipase values did not rise even after vagal or hormonal stimulation. Generally, if the stimulation of the pancreas by secretin or urecholine is sufficiently great a clinical attack of pancreatitis will occur with obstruction (as in our patient) with an attendant serum elevation of amylase and lipase. The lack of enzyme response in this patient was an indication preoperatively of the extensive destruction of the gland. The reaction to urecholine stimulation preoperatively was indeed startling. The induced attack of pancreatitis was of such severity that the study had to be concluded prematurely. The patient was screaming and writhing with epigastric and back pain. The spasm was of sufficient intensity to completely choke off all pancreatic secretion 40 minutes after injection of the drug.

The success of decompression in this patient was indicated by the remarkable alteration in response to urecholine and secretin stimulation postoperatively, and the extreme subjective improvement. The chemical studies were not repeated postoperatively because in addition to the expense and the discomfort of reintubation, it was felt that altered values would be of little significance. For it could be argued that removal of the ductal stones was adequate in itself to completely relieve the obstruc-

tion to the gland. Indeed, this occurred to us at the time of operation before caudal pancreaticojejunostomy was begun. However, it was reasoned that the calcinosis was secondary to obstruction initially and that removal of the stones alone might well be followed in the future by further episodes of obstruction. Accordingly caudal decompression was performed. (We are experimenting with methods to prove postoperatively the patency of the pancreatic enterostomy by roentgenographic means, thus far unsuccessfully.)

Since the majority of patients with chronic pancreatitis show pronounced evidence of obstruction, it seems reasonable that this relatively simple approach to the treatment of this benign crippling disease should be further pursued. Only after a period of years can the value of the procedure be assessed. While undoubtedly there will be occasional failures, it would appear from early reports that with careful selection, and rejection of cases not meeting rigid criteria for obstruction, the number of poor results should be minimal. In any event it seems that this operation may well become the procedure of choice in the treatment of severe chronic pancreatitis.

SUMMARY

Pancreatico-enterostomy in obstructive pancreatitis is a relatively simple procedure in experienced hands. Preliminary reports are very encouraging regarding this operation in the treatment of this benign but crippling disease.

A report of a case in which a patient was greatly benefited is presented in detail in hope of encouraging further consideration of this operation for severe recurrent pancreatitis.

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Thromboendarterectomy in Occlusive Arterial Disease

Pathologic Examination a Year and a Half After Operation

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THE DEFINITIVE surgical treatment of occlusive disease being in its relative infancy, reports of late follow-up and pathological studies to determine patency of vessels, adequacy of blood flow and clinical evaluation, are of considerable interest.

With this in mind, the following report of continuing clinical observation and then postmortem studies a year and a half after aortic-iliac thromboendarterectomy is submitted.

REPORT OF A CASE

A man 40 years of age was first seen on October 11, 1954, with complaint of increasing intermittent claudication of the muscles of the left calf for two years. The symptoms had become so severe that he could walk only one or two blocks. (The patient had been referred for vascular study by a physician who had removed the nail of the left great toe because of bluish discoloration and apparent infection under it. Cyanosis of the toe persisted, low-grade infection did not abate and gangrene seemed incipient.)

Submitted December 12, 1956.

When questioned about the history of increasing claudication for two years, the patient said he had noticed no particular intolerance of cold but that both feet were usually cool and perspired excessively. He had not had claudication in the right leg. He said he had had no pain or cramps in the legs while at rest. There was no history of frost bite or of migratory phlebitis. Except for slight cramping in the left hand when he was working with his fingers, the patient had noticed no other pains or paresthesias in the extremities. There had never been apparent change of color in any of the extremities except for that which had been recently noticed in the left foot. The only symptom of cardiac nature was "tightness in the chest" soon after smoking.

The patient smoked one and a half packages of cigarettes a day and drank moderately.

A gastric resection for ulcer had been done some two years previously, and inguinal herniorrhaphy (with recurrence) 14 years previously. Tonsillectomy and adenoidectomy also had been done some 14 years ago.

Upon physical examination the patient was observed to be flushed, plethoric-looking, perspiring rather freely. Slight tremor and nervous irritability were observed. The blood pressure was 150/100 mm. of mercury. The pulse rate was 96 and the rhythm regular. There was a subcostal scar on the right side, a right inguinal herniorrhaphy scar (with recurrence of the hernia) and a left inguinal hernia.

The upper extremities were normal except for excessive perspiration. The radial and ulnar pulses were normal. The right leg appeared normal. The foot, normal in color and texture, was slightly cool and perspiring freely. There was no gross abnormal color change on the right side on elevation or dependency of the limb, and the venous filling on dependency was normal in 15 seconds. The peripheral pulses on the right, including the femoral, popliteal, dorsalis pedis and posterior tibial, were palpable.

The nail of the left great toe was absent and the superficial wound of the nail bed was not healed. There was mottled cyanosis and dusky rubor involving the great toe and also the distal end of the foot and the toes. The temperature of the left foot was perceptibly cool. The foot was perspiring profusely. No trophic changes of the skin were noted. There was no loss of hair. Arterial pulses on the left were completely absent below the inguinal ligament. A faint pulse could be felt just above this level. On elevation the left foot blanched, with some pale dusky cyanosis remaining in the great toe. On dependency the venous filling began in about 20 to 25 seconds and was complete in about one minute. Mottled cyanosis and rubor of the toes, most pronounced in the great toe, developed.

In roentgenographic studies of the lower extremities, no evidence of arterial calcification was seen.

A tentative diagnosis was made of occlusion of the left iliac artery owing to arteriosclerosis or, possibly, thromboangiitis obliterans.

Further studies were advised but in the interim the patient was treated conservatively with Priscoline® by the referring physician. After about three weeks in which the condition of the great toe did not improve, throbbing pain persisted and paresthesia developed, the patient returned for further study. At this time the distal foot was a little more cyanotic than before, and the great toe was cyanotic and cool. Both feet were perspiring profusely.

On November 10, 1954, left lumbar sympathectomy was done, including the lumbar ganglia—one through four. The foot became warm and dry, the color improved and the wound in the nail bed healed.

Eight days after sympathectomy, an aortogram showed an occlusion at the terminal aorta becoming apparently complete in the common iliac artery on the left, and with incomplete obstruction extending into the external iliac and hypogastric arteries. There was delayed filling of the femoral artery, but the distal arterial tree appeared to be patent.

On January 12, 1955, aortic-iliac thromboendarterectomy was carried out and a large occlusive thrombus beginning at the terminal aorta and extending well down into the external iliac artery and involving the orifice of the hypogastric artery was removed.

The patient recovered promptly. The left foot remained warm and dry, and the patient was soon walking about the house without claudication. Foot pain and paresthesia, previously present, had disappeared. There was a strong femoral pulse palpable on the left and a palpable posterior tibial pulse.

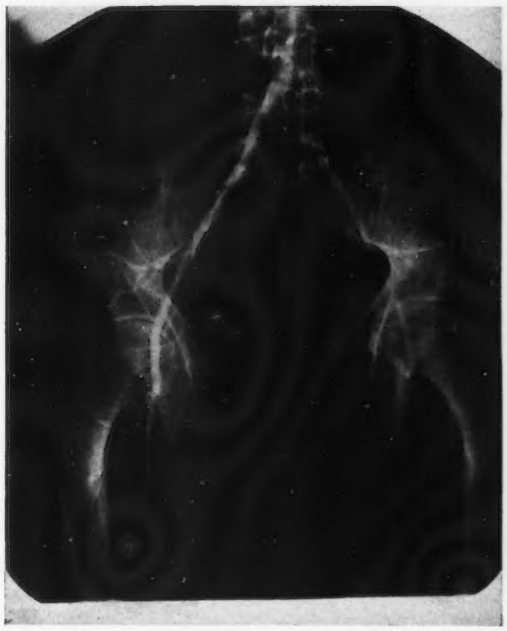

Figure 1.—Aortogram showing complete block at aortic bifurcation extending distally into the external iliac artery and partially into hypogastric artery.

Figure 2.—Calcific thrombus removed from terminal aorta and left iliac, common and external, showing a small tail thrombus attached, which protruded into hypogastric artery.

When the patient was observed a month after operation, the foot was warm and dry and he was walking without claudication. He had complained of partial impotence, before operation, and said there was improvement afterward.

Three months after operation the patient had no symptoms referable to the leg that was operated upon. He was fully employed, working eight hours a day and dancing frequently at night. He said that although he was not impotent, he had lost his ejaculatory power.

Four months after operation the patient apparently had infectious hepatitis. He was treated by a local physician and recovered.

Figure 3.—Close-up of aortic-iliac segment showing wide patency and smooth intimal lining of side operated on, and narrowing and sclerosis of opposite iliac with a stenosed aortic orifice of right common iliac. The pigmentation of the intima on the side on which operation was done is hemosiderin.

Figure 4.—Cross-section of right iliac artery (not operated upon), showing extensive calcific thrombosis with partial occlusion. Arrow indicates "cleavage plane" along which a thrombus may be "shelled out" in performing endarterectomy.

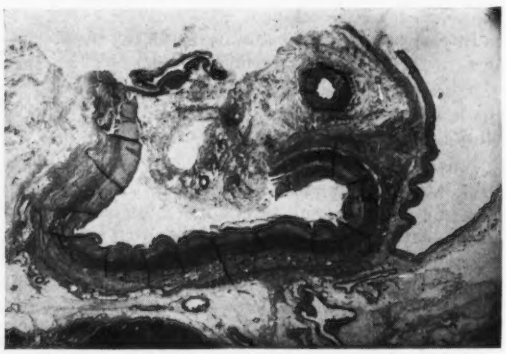

Figure 5.—Cross-section of left common iliac artery a year and a half after endarterectomy. Artery also was split longitudinally. Note widely patent vessel with good wall and endothelial lining. (The dark lines transecting vessel wall are artifacts due to wrinkling of cut sections in preparation of slides.)

Five months after the operation the foot was still warm and dry, there were no symptoms referable to the leg and the patient was fully employed. A completely new, normal nail had grown on the left great toe. The capillary circulation of the skin was excellent.

A month later the patient began to complain of mild symptoms referable to the previously uninvolved right leg; he noted fatigue and tightness in the right calf after walking three or four blocks, and profuse perspiration of the right foot as contrasted with the dry and warm left foot.

A year after the operation the patient spoke of more pronounced symptoms in the right leg on walking, and the foot was cool and perspiring rather profusely. The venous filling had become delayed 25 to 40 seconds and there was very faint rubor on dependency. The right foot at this time was somewhat cooler clinically than the left. The femoral pulse on the right was palpable, but the distal pulsations, previously palpable, were absent. The left leg and foot remained warm and dry and painless. Right lumbar sympathectomy was suggested but the patient demurred.

A year and a half after the aortic-iliac thromboendarterectomy, on July 23, 1956, information was received that the patient had died rather suddenly "while on a party with a friend." A coroner's autopsy was done and death was ascribed to "acute coronary occlusion, with evidence also of an old coronary occlusion with a recanalized thrombus in the coronary vessels."

The following day permission was obtained to secure and study the aortic and iliac vessels. On gross inspection there was obviously a widely patent left common iliac artery which previously had been completely occluded. There was a sharp line of demarcation at the site of the upper end of the endarterectomy in the terminal aorta, and a smooth, glistening, patent arterial wall distal to this point. There were rather pronounced atherosclerotic plaques and changes, proximal to the area of operation, and partial arteriosclerotic occlusion of the right common and external iliac arteries.

Pathologist's Report

The pathologist's report was as follows:

The specimen was the lower 10 cm. of the aorta and a segment of both common iliac arteries in continuity. One common iliac artery was stated to have been the site of an endarterectomy one and one-half years before the death of the patient. The other common iliac artery had not been so treated. On the treated side the intima appeared thin and firmly adherent to the media. There were thin, longitudinal markings apparent on the surface. Pronounced atherosclerosis was observed in the untreated iliac vessel. The intima was thickened. It was friable and was easily separated from the media.

Grossly, the difference between the left and the right iliac artery was striking. The lumen of the left vessel was widely patent with superficial brown discoloration of the intimal lining limited to the site of the endarterectomy and presumably due to hemosiderin. No thrombi were noted within the lumen of this vessel. Decided calcific arteriosclerosis and atherosclerosis were present in the right iliac vessel.

For microscopic examination, specimens were stained with hematoxylin and eosin and with special stains for elastic tissue. In the right iliac artery (the one not operated upon), pronounced calcific atherosclerosis and arteriosclerosis were observed. Elastic tissue boundaries of the vessel were distinct. The left vessel wall likewise had distinct elastic tissue boundaries. The immediate subendothelial portion was the site of superficial fibrosis. There was no obvious atherosclerotic deposition. The lumen of the vessel was widely patent.

SUMMARY

A case is presented of segmental, occlusive aortic-iliac, arteriosclerotic thromboendarteritis with preoperative and postoperative clinical observations and pathologic study a year and a half after aortic-iliac thromboendarterectomy.

The prolonged improvement in circulation (evidenced clinically and corroborated by the observation of widely patent vessels without thrombosis) one and a half years after endarterectomy adds to the evidence in favor of this method of management for segmental arterial occlusion in the larger vessels.

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Metastatic Epidural Abscess with Complete Recovery After Operation

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ALTHOUGH metastatic epidural abscess is an infrequent disorder, early diagnosis is of great importance, for prompt surgical treatment enhances the prospect of recovery without neurologic impairment. More than 200 cases have been reported in the literature, and in the first three decades of this century the mortality rate was above 90 per cent; now it is 20 to 30 per cent but neurological complications remain high. In addition to operation before signs of cord compression develop, prognosis depends upon the infecting organism, the resistance of the patient and the sensitivity of the organism to antibiotics.

Although the condition may mimic many diseases, still the history is very important in arousing suspicion of epidural abscess. Usually there is history of a previous minor or major cutaneous infection (acne, furuncle, carbuncle). However, any reservoir of sepsis can conceivably cause an epidural abscess either by hematogenous spread or by direct extension. Skin infections are by far the most frequent cause of this condition, and the causative organism is usually staphylococcus aureus. Usually, also, there is sudden onset of severe, aching pain at the affected level and later radiation of the pain (root pain). These pains are much more persistent and severe than those associated with other conditions that may be considered in the differential diagnosis (poliomyelitis, meningitis, osteomyelitis, acute arthritis, inflammatory epidural tumors, multiple sclerosis, anterior spinal artery occlusion, transverse myelitis and infectious polyneuritis). History and symptoms of the kind mentioned should lead to suspicion of the disease before it has reached a paralytic phase, but often the diagnosis is not made until motor and sensory disturbances develop.

Commonly at examination the patient appears to be acutely ill, has fever, tachycardia, usually local spinal tenderness, signs of meningeal irritation and root pain. The neurological symptoms will vary depending upon the extent of the pathologic change at the affected site when the patient is first observed. Leukocytosis is common. Spinal fluid pressure will be consistent with partial or complete subarachnoid block. The fluid may be clear to yellow, contain a few leukocytes and have a very high protein content.

Submitted May 21, 1957.

REPORT OF A CASE

An 18-year-old white girl had been in good health until a week before admittance to hospital, she had rather sudden onset of low back pain without radiation. The pain was constant but not severe enough to interfere with sleep. The pain persisted for three days and a physician who was consulted prescribed aspirin. In three days, backache had completely subsided, then the following night, seven days after the onset, the low back pain returned with great intensity and radiated to the inner and posterior aspects of the thighs. It was so severe the patient could not lie flat in bed.

On repeated questioning, the patient recalled that two weeks before the present illness, she had had rather severe pain and inflammation for two days in the left forefinger and that about seven days later a little pus had drained from the lesion. She also recalled that a week before the present illness she had squeezed pus from a painful pimple in the right axilla, whereupon the pain was completely relieved. However, about four days before she was put in hospital she noticed a tender lump high in the left axilla. During the entire illness, she did not feel malaise, had no chills, fever or stiff neck, and had excellent appetite.

Upon examination, the patient appeared acutely ill. Sudden flexion of the neck caused pain in the low back. Tenderness to percussion and palpation over the lumbar area was noted but there was no localized area of tenderness. No definite motor weakness of the lower extremities was present. Moving the legs, however, caused pain in the back. The sense of position was intact and sensation to pain was undiminished. There was definite hyperesthesia

to touch over the inner aspects of the thighs. A large, tender deep-lying, nonfluctuant mass was palpated in the left anterior axillary line. The bladder was greatly distended; 1250 cc. of urine was removed by catheter.

The important laboratory findings were the following: Leukocytes numbered 14,600 per cu. mm. of blood—neutrophils 84 per cent, small lymphocytes 8.5 per cent, large lymphocytes 2.5 per cent, monocytes 4 per cent and eosinophils 1 per cent. The hemoglobin content was 10.2 gm. per 100 cc. and erythrocytes numbered 3,850,000 per cu. mm.

The spinal fluid was xanthochromic and it contained 51 cells per cu. mm., 85 per cent of them lymphocytes and 15 per cent neutrophils. The protein content was 525 mg. per 100 cc. The pressure of fluid was 22 cm. of water; it did not increase upon jugular compression. Pantopaque® was introduced and a complete block at the level of the first lumbar vertebra was noted radiographically.

The patient was given 600,000 units of procaine penicillin G, 200,000 units of buffered crystalline sodium penicillin G, 0.50 gm. of streptomycin and 0.50 gm. of dihydrostreptomycin intramuscularly and was taken to the operating room four hours after admittance. An incision was made exposing the spines and lamina of the twelfth thoracic and the first lumbar vertebrae. The subcutaneous tissues were edematous and there was little bleeding. Upon removal of the lamina exposed, a large reddish mass was noted. It was ruptured in an attempt to expose it further and it was observed to be an abscess containing approximately 10 cc. of greenish yellow pus. Cultures were made of the pus. After the area about the lesion was aspirated, it was washed with saline and penicillin solution. The dura appeared normal, and the cord seemed decompressed by the procedure. Two gauze packs impregnated with bismuth tribromphenate were placed in the extradural space, and the skin was closed with interrupted wire retention sutures. Hemolytic staphylococcus grew on the culture.

The postoperative course was uneventful. Catheterization of the bladder was necessary three times. On the eighth postoperative day, the axillary mass was fluctuant and it was incised and drained of 45 cc. of seropurulent material. The patient stayed 11 days in hospital and during that time received 600,000 units of aqueous solution of procaine penicillin and 0.5 gm. of streptomycin every 12 hours, given intramuscularly. At the time of discharge, she had 75 cc. of residual urine after voiding. Upon neurological examination two months after operation, no abnormalities were noted. There was no residual urine.

SUMMARY

A case of epidural abscess is reported. The condition is rare, but if it is kept in mind in all cases of severe pain in the back and meningeal irritation, and then a history of previous infection is obtained, the diagnosis can almost always be made by information supplied by spinal fluid examination. If operation is done early enough in the course of the disease, prognosis is good.

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"Stiff-Man" Syndrome—Progressive Fluctuating Muscular Rigidity and Spasm

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A PATIENT with symptoms and signs not identifiable with any disease known to the author and, perhaps, not previously described, was observed. A survey of pertinent literature gave no helpful clues. While the patient was being studied, Moersch and Woltman[4] described a small series of 14 similar cases observed over some 30 years at the Mayo Clinic and reported for the first time.[4] They knew of no other such patients and could not fit their findings into an accepted diagnosis.

The following case is presented to call further attention to the syndrome and its possible treatment.

REPORT OF A CASE

The patient, a 36-year-old white, married citrus rancher, sought medical advice because of "trouble with my legs and arms." It was difficult for him to date the onset of illness. He believed that he had had recurring aching pains and stiffness in his back and shoulders over the preceding 10 years, the episodes growing more frequent and severe. During the previous year the symptoms had spread to the arms and legs and a definite stiffness and jerkiness of movement had been noticed. More recently he had begun to notice impairment of walking and, less frequently, impairment of ability to carry objects. He had become aware that although his strength seemed unimpaired he could not trust the control of his muscles. He illustrated by saying that he could easily lift and carry an 80-pound bag of fertilizer but, quite inexplicably and with no sense of tiring, he would suddenly fall in complete collapse after carrying it

From Cottage Hospital, Santa Barbara.

Submitted May 7, 1957.

some 15 or 20 feet. Then a moment later he would stand, rise, lift the burden and walk on. He told of similar but less frequent episodes of unexpectedly dropping either light or heavy objects he was carrying in his arms. Moderate aching pains and stiffness were nearly always present diffusely through arms, legs, upper back and the back of the neck and shoulders. The aching, spotty and irregular, became more severe and gradually actual stiffness became more pronounced. Except for the episodes mentioned, he felt that his strength remained unimpaired—if the stiffness did not interfere. He did not consider himself ill.

Seven years before, he had had appendectomy for uncomplicated acute appendicitis. During World War II he had served in Hawaii, the Philippines, Guadalcanal and New Guinea. He had been shot in the right foot but received only an uncomplicated flesh wound. During his service he had also had tonsillitis and, later, dengue fever with complete recovery. He had always worked on ranches and during the preceding ten years had had intermittent exposure, outdoors, to chemical dusts such as DDT and 2-4 D. The dusts were all routinely used commercial products, never to the patient's knowledge causing acute illness.

The family history had no bearing on the illness.

Upon physical examination it was observed that the temperature, pulse, respirations and blood pressure were consistently within normal limits. The right upper eyelid drooped very slightly. Cranial nerves were intact. No abnormalities of the pupils and fundi of the eyes were noted. Deep reflexes were normally active and equal bilaterally. Plantar responses were normal. Abdominal and cremasteric reflexes were intact. Sensation was unimpaired. All muscles of the shoulder groups, the entire back and upper and lower legs seemed quite hard and tense. From time to time, on one side or the other, isolated groups of these muscles were noted to be almost rigid—to remain so a few hours or days and then return to the ordinary tense state. No regularity of such changes could be determined.

The result of a test of the blood for syphilis was negative. Erythrocytes numbered 5.5 million per cu. mm. and the hemoglobin content was 16.0 gm. per 100 cc. Mean corpuscular hemoglobin was 29.2 micromicrograms. Leukocytes numbered 11,950 per cu. mm.—43 per cent neutrophils, 2 per cent stabs, 39 per cent lymphocytes, 3 per cent monocytes, 10 per cent eosinophils, and 3 per cent basophils. (Several months later erythrocytes numbered 5.03 million per cu. mm. Hemoglobin content was 15.4 gm. per 100 cc. The hematocrit determination was 39 per cent; mean corpuscular hemoglobin, 31 micromicrograms; mean corpuscular volume, 79 cubic microns; mean corpuscular hemoglobin content, 39 per cent. Leukocytes numbered 13,200 per cu. mm.—neutrophils 49 per cent, stabs 4 per cent, lymphocytes 36 per cent, monocytes 4 per cent, eosinophils 6 per cent, and basophils 1 per cent.)

Results of urinalysis were within normal limits. No parasites were noted in a specimen of the stool and a guaiac test was negative for blood.

The sedimentation rate (Westergren) was 1 mm. per hour. Agglutination was negative for brucellosis. Nonprotein nitrogen content was 33 mg. per 100 cc. of serum. No lupus erythematosus cells were found in the blood. Serum potassium content was 5.6 mEq. Fasting blood sugar was 120 mg. per 100 cc.; total protein was 6.1 gm. per 100 cc.—4.1 gm. albumin and 2.0 gm. globulin. Results of skin testing with coccidioidin and histoplasmin were negative; with tuberculin, positive.

The basal metabolic rate was minus 23.

Coproporphyrin in the urine for 24 hours was within a normal range; uroporphyrin and porphobilinogen not present.

No abnormalities were noted in an electrocardiogram.

Results of roentgen examination were: No evidence of pulmonary or pleural disease; heart and mediastinal structures normal in appearance; no evidence of spinal fracture or dislocation or of bone or joint destruction; slight marginal osteoarthritic spur formation in the thoracic spine; numerous small calcifications in the spleen.

No satisfactory diagnosis could be made, and various therapies were tried on an empirical basis. These included administration of salicylates, codeine, sedatives, prednisone, chlorpromazine, physiotherapy, psychotherapy and placebos. None made the slightest difference, and the patient continued to have unexpected falls and to drop objects. After five months, Flexin® (zoxazolamine, 2-amino-5-chlorobenzoxazole) was administered and the dose gradually was raised to 2.0 gm. a day. In the ensuing four months to the time of this report, the patient insisted that his condition was improved; there were no falls or dropping of objects. Upon examination of the muscles, however, no change was noted.

DISCUSSION

The outstanding features of this case, as in the few others like it that have been reported, were the progressive muscular disability, recurring rigidity of muscles, the patient's falling like a "wooden man" and the fact there was no ascertainable cause for the syndrome. What caused the mild eosinophilia and leukocytosis, conditions not noted in other cases, is not known. Slightly high fasting blood sugar also occurred in one of the other reported cases. In addition, the presence of reducing substances in the urine was observed in four of the reported cases. That and the fluctuating intensity of symptoms led Moersch and Woltman[4] to say, "A metabolic basis for the malady should be considered." The only other abnormality they noted in laboratory studies was a high basal metabolic rate (plus 56, plus 65, plus 77) in three of four patients given this test. "The high rates," these investigators said, "were attributed to muscular activity, since there was no other evidence of hyperthyroidism." In two cases in which muscle biopsy was done, no pathologic changes were observed.

The response to Flexin in the present case was definite, but incomplete. Stiffness, subjectively evaluated, was less and no falls or dropping of objects occurred after administration of the drug was started. Balance in walking, originally very poor, was slightly better but was still poor. Objectively, there was no change in the muscles.

Flexin, a recently introduced mephenesin-like drug chemically unrelated to mephenesin, has been found to be of help in preventing or relieving spasm in voluntary muscles. The site of action is thought to be within the central nervous system upon polysynaptic pathways, where it causes depression with resultant relief of muscular spasm.[3] It is not believed to act upon muscle, the myoneural junction, motor nerves or monosynaptic reflex arcs. Use of it has been reported in rheumatic diseases,[5] in cerebral palsy[1] and in a variety of neurological disorders due to disease in either the brain or spinal cord.[2] A majority of the patients were appreciably helped. Patients with brain disorders were not helped as much as those with spasticity due to lesions of the upper motor neuron variety. Toxic reactions (chiefly gastrointestinal) generally were minor and all were reversible upon discontinuance of the drug.

SUMMARY

A case of "stiff-man" syndrome (progressive fluctuating muscular rigidity and spasm) in which treatment with Flexin was moderately helpful is reported.

Veterans Administration Hospital, Pittsburgh 4, Pennsylvania.

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Successful Prochlorperazine Therapy Following Chlorpromazine-Induced Jaundice

JAMES E. REEVES, M.D., San Diego

SINCE CHLORPROMAZINE came into general use by physicians in the United States in 1954, chlorpromazine-induced jaundice has been reported in a small number of patients.[1-4] Because of the structural similarity of chlorpromazine and prochlorperazine, and the fact that they are used in similar indications, the present case is of interest in that the patient became jaundiced when treated with chlorpromazine but was subsequently treated with prochlorperazine without complications.

REPORT OF A CASE

The patient, a 72-year-old white housewife, first observed December 23, 1955, had chronic bronchitis and a moderate anxiety state which was manifested in episodes of dizziness, fatigue, and "nervousness." Chlorpromazine, in daily doses of 25 mg., was administered orally for 11 days. The symptoms were dramatically relieved, and on January 4, 1956, a physical examination showed no significant abnormalities. Results of examination of the blood and urine and determination of serum protein were considered normal, and chlorpromazine therapy was discontinued.

The clinical history of the patient was of some interest. At the age of 17 she had had a stillborn infant at full term. Two spontaneous miscarriages, each after about three months' gestation, followed. At age 26 a hysterectomy was performed for reasons unknown. Hemorrhoidectomy was done at age 57 without complications. Four years before the present illness, the patient had an attack of nausea, vomiting, and diarrhea of several weeks' duration, but this was not accompanied by jaundice and cleared up without specific treatment. She had always considered herself to be extremely nervous.

On January 11, 1956, the patient had an attack of nausea, vomiting, malaise and diarrhea. The temperature was 101° F. Cremomycin®* and a bland diet were prescribed. In four days the temperature returned to normal.

By January 20 the gastrointestinal symptoms had abated, but in the afternoon of that day the temperature was 99.8° F. The patient had severe pruritus and definite jaundice. She was admitted to hospital in an acutely ill condition. The icteric index was 57 units, thymol turbidity 8 units. The result of a cephalin flocculation test was negative in 48 hours. The cell contents of the blood remained within normal limits. The urine was strongly positive for bile. Symptomatic treatment with fluids, a fat-free diet, Benadryl® (diphenhydramine hydrochloride) and mild sedatives was carried out but the patient did not improve.

On January 30 the icteric index was 63 units. Radiographs of the abdomen were considered normal, and a consultant recommended further observation and administration of steroids.

From February 1 to February 8 hydrocortisone was administered, 40 mg. four times daily, and from

Submitted May 27, 1957.

*Each 30 cc. contains: "Sulfasuxidine" succinylsulfathiazole, 3.0 gm.; colloidal kaolin, 3.0 gm.; pectin N.F., 0.3 gm.; neomycin sulfate, 300 mg.

February 8 to February 18, 20 mg. four times daily. Appetite and general health seemed to improve. The alkaline phosphatase, as determined during this time was 15 units and serum bilirubin 8 mg. per 100 cc. The cell content and protein levels in the blood were within normal limits. No abnormalities were noted in radiographs of the gastrointestinal tract.

On February 18 laparotomy was done. The liver was firm and blackish-green. The gallbladder and common bile duct were empty. Biopsy of specimens taken from the liver indicated a decided pericentral bile stasis within the intralobular bile capillaries and Kupffer cells. The bile canaliculi were filled with bile pigment. The central veins were not dilated, and there appeared to be little, if any, increase in the inflammation of the cells of the portal region. A few lymphocytes were present in the portal connective tissue, but there was no increase in the portal connective tissue itself. In one area a few lymphocytes were seen in the sinusoids of the liver. Other than bile stasis with some secondary changes in adjacent cells, no pathologic change was noted. The pathologic diagnosis was: Pronounced bile stasis of the liver, of unknown cause.

The patient recovered promptly from the operation and left the hospital a week later.

Loss of weight continued and icterus increased. The icteric index, as determined at monthly intervals, averaged 100 units. Pruritus was controlled fairly well with antihistamines, atropine and cold applications.

In July, large amounts of sugar were added to the diet. By coincidence or otherwise, jaundice began to clear, and a slow but progressive weight gain began. By the middle of October the patient appeared well and the results of laboratory examinations were within normal limits.

Later in the fall of 1956, episodes of nervousness similar to those that had occurred before were noted. Sedation and psychotherapy did not help. Some kind of tranquilizing drug was felt to be indicated, but chlorpromazine was not considered because of the earlier chlorpromazine-induced jaundice. On November 26, 1956, prochlorperazine therapy was started after a thorough series of liver function studies. The drug was given from November 26 until November 30 in 5 mg. doses twice a day. The patient noted complete relief of all symptoms. At the request of the patient the dose was increased to 5 mg. three times a day, and this regimen was continued to January 28, 1957. Jaundice did not occur and repeated liver function tests showed no abnormalities.

SUMMARY

Severe jaundice occurred in a 72-year-old white woman nine days after discontinuance of chlorpromazine, which had been given for only a short time and in small amount. No beneficial results were observed when the patient was treated with steroids, but when large amounts of sugar were added to the diet, she promptly recovered. Prochlorperazine was administered a year later for the nervousness that had necessitated chlorpromazine. The patient was promptly relieved and then continued to take prochlorperazine for more than two months without evidence of hepatic damage.

205 Walnut Avenue, San Diego 3.

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California MEDICINE

For information on preparation of manuscript, see advertising page 2

EDITORIAL

Joint Blood Council

THE JOINT BLOOD COUNCIL is a voluntary, nonprofit organization embracing the five national associations principally concerned with the procurement, processing, preservation and distribution of human blood and its derivatives. These are the American Association of Blood Banks, American Hospital Association, American Medical Association, American National Red Cross and American Society of Clinical Pathologists.

From World War II until the outbreak of hostilities in Korea in the summer of 1950, blood banks kept growing and increasing in number and variety, but there was little coordination either technically or administratively on a local or national basis. Conflicts arose between the Red Cross and the private banks in the commercial, community and hospital categories. Seeking a way out of this confusion of aims and interests, the Medical Policy Committee of the Red Cross under pressure called a meeting which led to the Boston Agreement of 1950. Other organizations hoping to insure the shipment of sufficient whole blood to Korea sent representatives to Boston. The American Association of Blood Banks (representing the California Blood Bank System), the American Hospital Association, the American Medical Association (representing the C.M.A. Committee on Blood Banks), and the American National Red Cross all later ratified the agreement. It provided for free exchange of blood between Red Cross blood centers and other blood banks on a unit for unit basis and urged adherence to blood banking standards to be set by the National Institutes of Health.

Military and civilian blood requirements were met during the Korean War and the Boston Agreement remained the official policy of the organizations that signed it. However, different interpretations of its language and intent led to more conflict. There was clear need for something more; and the parties to the Boston Agreement, together with the American Society of Clinical Pathologists, decided there should be a voluntary national organization to insure an adequate supply of blood in peace or emergency and to stimulate blood research. Thus the Joint Blood Council came into being on March 16, 1955. Subsequently it opened an office in Washington, D. C. This entire program was stimulated by the A.M.A. through passage of the Ludwig Resolution introduced to the A.M.A. House of Delegates by Dr. J. Lafe Ludwig of the California Medical Association in June 1953. The resolution is as follows:

"WHEREAS, The ready availability of blood and blood derivatives has become a vital necessity to modern practice in both the civilian and military populations and therefore a matter of highest concern to the physician; and

"WHEREAS, The independent operation of blood banks of all degrees of excellence throughout the nation by many different agencies, some lay and some medical, has resulted in some confusion and friction between blood banks and organizations operating blood banks; and

"WHEREAS, The general public is confused, irritated and critical of the varying methods of operation among blood banks in the same or contiguous areas; and

"WHEREAS, The professional aspects of the drawing of blood, its fractionation and its use as a therapeutic tool must be under medical control, and such medical control on a national scale logically should be a function of the American Medical Association; and

"WHEREAS, The American Red Cross has already been designated by the government as the official

blood recruitment and distributing agency for the military services; and

"WHEREAS, The present American Red Cross program of so-called 'free' blood without requirement for replacement has made collection of adequate supplies for civilian use difficult, has been a tremendous drain on Red Cross funds which might be better devoted to purposes more consistent with Red Cross functions, and is inaccurate to the extent that blood is not free but is paid for by the community at large in contributions and by the government through tax revenues; now therefore be it

"RESOLVED, That this House of Delegates urge the establishment of a coordinated national blood bank program operated by the American Medical Association, the American National Red Cross and other qualified organizations interested in blood banking, on the following basis:

1. Medical aspects of blood banking shall be under the exclusive control of the medical profession.
2. Business administration, donor recruitment, stockpiling for civil defense and disaster relief, allocation of supplies to meet military needs, and public relations shall be matter of joint concern.
3. The supply of blood shall be maintained on a replacement basis.
4. The national blood bank program shall be a financially self-supporting but nonprofit arrangement operated in the national interest but with the sole aim of promoting the widest availability of safe, usable blood and its derivatives."

The primary purpose of the Council is to establish a national blood program in order to assure an adequate supply of blood and blood derivatives to the civilian and military population at all times. Corollary purposes shall be to:

1. Develop ways and means to make blood and its derivatives available to all persons in the United States;

2. Stimulate and advise on areas of research in the collection, preservation and use of blood and its derivatives;

3. Collect, study and disseminate information on blood and blood derivatives;

4. Establish minimal standards for voluntary accreditation of blood banks and to establish a means of inspection for accreditation;

5. Coordinate existing systems and encourage and institute plans where necessary for the exchange of blood or blood credits between accredited banks on a state, regional and national basis;

6. Encourage the public by appropriate means to donate blood for civilian and defense requirements and to assist in the establishment of uniform national publicity policies;

7. Distribute annually a list of blood banks accredited by this organization;

8. Serve, upon invitation, as a fact-finding and arbitration body in disputes arising from the collection and use of blood and its derivatives;

9. Serve upon invitation as an advisory group to federal and military agencies having to deal with blood and its derivatives.

The Council itself does not procure blood, does not process or store it, and will not itself engage in blood research. Operating primarily through its member institutions it tries to stimulate all worthwhile operations in the entire field of blood.

As to philosophy on the question of charges, the Council by-laws state: "Since blood is derived from human beings only, it should not be sold for profit. However, all services rendered in the collection, storage and administration of blood cost something and are paid for by or on behalf of every recipient of such services. When a service charge is made to the recipient, it may include all or part of the costs of operation, including normal depreciation but the intentional realization of substantial profit is not approved."

As to the accomplishments of the Council, it was disappointing to California doctors that the Council did not take steps toward becoming the contracting agent with the Department of Defense before the recent and current serum albumin project was instigated. This matter was called to the attention of the A.M.A. House of Delegates in June of 1957 by a resolution offered by Dr. Robertson Ward of the California Medical Association. However, it is well to point out that more than 5,200 hospital blood banks and other blood transfusion services have received or are now receiving by mail a questionnaire from the Joint Blood Council, representing a major effort to provide a guide to the vast and almost uncharted sea of blood banking and related activities in the United States. This questionnaire represents a second phase of the Council's efforts to bring the blood transfusion picture into proper focus. The first part was a postal card survey of blood usage during the calendar year 1956. This survey produced some eye-opening information on the sources of blood in the United States. It also supplied the first reliable information on how much blood is being transfused in the nation.

The Council itself grew out of the need for closer cooperation among facilities which handle blood and between the independent blood banks and the regional and national banking systems. Its current survey of blood transfusion services is a step in that

direction. The Council's preliminary research has firmed its conviction that blood transfusion services are operating under handicaps that cry out for remedy; likewise the Council's realization that remedies can be applied only after proper diagnosis. The current questionnaire will help clarify the symptoms that will make diagnosis and remedy possible, but its success depends greatly on the number and quality of replies to the questionnaire. Thus the Council emphasizes that the sooner its questionnaire is filled out, analyzed and interpreted, the sooner will there be a general fund of information necessary to the proper development of a national blood program—a well known and respected transfusion service to the people of the United States through the medical profession.

Postgraduate Education Courses for 1958 Annual Session

AN INNOVATION in C.M.A. meetings is being planned for the 1958 Annual Session. It is proposed to offer three postgraduate education courses of 9 hours each in connection with the scientific meetings. They will be given from 9 a.m. until noon, Monday, Tuesday and Wednesday, April 28 to 30. It is expected that official credit would be given for these courses.

As now planned, each of the three medical schools in Southern California would put on a course of three hours daily for the three days of the meeting.

Present plans call for University of Southern California to handle a course on liver diseases. U.C.L.A. Medical School would present a course on abdominal pain and College of Medical Evangelists would take charge of a series on management of trauma.

It is planned to make an admission charge for these courses, although the full details remain to be worked out.

Further announcements will be made when plans are completed.

California MEDICAL ASSOCIATION

NOTICES & REPORTS

PROPOSED CONSTITUTIONAL AMENDMENT

(First Publication)

Under the terms of the C.M.A. Constitution, amendments to the Constitution must lie on the table until "the next session, other than a special session, of the House of Delegates." During this interim the proposed Constitutional amendment must be published "at least twice in separate issues of the official journal of the Association."

The proposed Constitutional amendment below was introduced at the 1957 session of the House of Delegates and will be considered and acted upon at the 1958 session of the House of Delegates. At that time, "if two-thirds of the Delegates present and voting vote in favor thereof, the same shall be adopted." (Article VIII, Section 3, Constitution.)

RESOLUTION

WHEREAS, The physician member population of the State of California has enjoyed tremendous growth in recent years; and

WHEREAS, These physician members are entitled to representation in the offices and council of the C.M.A.; and

WHEREAS, The Constitution of the C.M.A. as it is presently constituted, does not adequately provide this representation; and

WHEREAS, In order to grant all members the representation they are entitled to, the Constitution of the C.M.A. must be amended;

NOW, THEREFORE, The following amendments of the Constitution of the C.M.A. are herewith presented to this House of Delegates in accordance with Article VIII, Section 3, of said Constitution.

AMENDMENTS

ARTICLE III

Part B—Council

Section 9—Composition

The Council shall consist of:

(a) Each Councilor District, as specified in this Constitution, shall be entitled to one Councilor for each 1,000 members, according to its membership as of the first day of November of the preceding year; provided that each Councilor District shall be entitled to a minimum of one Councilor.

(b) The President, President-Elect, Speaker and Vice-Speaker.

In addition, the Secretary-Treasurer, and Editor, ex-officio, without the right to vote.

(c) District Councilors shall be elected from the Councilor Districts.

(d) Elected Councilors from any one District shall not, at any time, exceed forty per cent (40 per cent) of the total Council membership.

Section 10—Councilor Districts

There are ten districts as follows:

District Number One, comprising San Diego County.

District Number Two, comprising Imperial, Orange, Riverside, San Bernardino, Mono and Inyo Counties.

District Number Three, comprising the County of Los Angeles.

District Number Four, comprising Ventura, Santa Barbara and San Luis Obispo Counties.

District Number Five, comprising Kern, Kings, Tulare, Fresno, Madera, Mariposa, Merced, Stanislaus, San Joaquin, Calaveras and Tuolumne Counties.

District Number Six, comprising Monterey, San

Benito, Santa Cruz, Santa Clara and San Mateo Counties.

District Number Seven, comprising San Francisco County.

District Number Eight, comprising Alameda County and Contra Costa County.

District Number Nine, comprising Marin, Solano, Napa, Sonoma, Lake, Mendocino, Humboldt and Del Norte Counties.

District Number Ten, comprising Sacramento, Amador, Alpine, Eldorado, Placer, Nevada, Sierra, Yuba, Sutter, Yolo, Colusa, Glenn, Butte, Plumas, Tehama, Trinity, Shasta, Lassen, Modoc and Siskiyou Counties.

Section 11—Election of Councilors

District Councilors shall be elected by vote of the delegates from each district in the manner and at the time specified in the by-laws; provided, however, that at the first meeting of the House of Delegates after a District Councilor has been selected, his name shall be submitted to the House by the delegates from the district, and (1) if there is no challenge by any delegate then the Speaker shall declare his election completed, and (2) if any delegate shall challenge the election on any ground, including fitness of the nominee of the district to serve as a District Councilor, the questions presented by the challenge shall be submitted to a Qualifications Committee consisting of the President, President-Elect and one delegate, appointed by the Speaker, from the Councilor District involved. The Qualifications Committee shall consider all grounds upon which the nominee is challenged and report back to the House. If the committee reports in favor of confirming the nominee's election, the Speaker shall declare him elected. If the committee reports against confirming the nominee's election, a three-fourths affirmative vote shall be necessary to sustain the report of the committee, in which event the nominee shall be ineligible to serve as the District Councilor and the delegates from the district shall immediately proceed to the selection of another nominee for the vacant office. If an adverse report of the Qualifications Committee is not sustained then the nominee shall be declared elected by the Speaker.

Section 14—Election of Councilors on Adoption of Amendments to This Constitution

Upon the adoption of Amendments to Article III, Part B, Sections 9, 10, 11 and 14 of this Constitution, the Delegates from each of the Councilor Districts shall proceed to elect District Councilors as follows:

At the annual meeting at which these Amendments to the Constitution are adopted, each District shall elect the number of Councilors to which the District is entitled, in accordance with Section 9, as amended, to serve for a term of three years.

Upon the adoption of the Amendments to this Constitution and the election of District Councilors, in accordance with the said Amendments, the terms of office of the Councilors-at-Large, holding office at the time of the adoption of the Amendments, will immediately cease and terminate.

In Memoriam

ALDRICH, WALTER SEWARD. Died in Sacramento, September 7, 1957, aged 56. Graduate of Northwestern University Medical School, Chicago, 1930. Licensed in California in 1930. Doctor Aldrich was a member of the Sacramento Society for Medical Improvement.

✤

BOYER, KENNETH HAROLD. Died September 18, 1957, aged 54, of heart disease. Graduate of Northwestern University Medical School, Chicago, 1931. Licensed in California in 1931. Doctor Boyer was a member of the Los Angeles County Medical Association.

✤

MARKS, JULIAN BARNETT. Died April 4, 1957, aged 65. Graduate of the University of Illinois College of Medicine, Chicago, 1918. Licensed in California in 1936. Doctor Marks was a member of the Los Angeles County Medical Association.

✤

MIRVISS, SOPHIE. Died July 31, 1957, aged 47. Graduate of the University of California School of Medicine, Berkeley-San Francisco, 1938. Licensed in California in 1938. Doctor Mirviss was a member of the San Francisco Medical Society.

✤

PLANK, TILLMAN HOWARD. Died August 15, 1957, aged 85. Graduate of Chicago Homeopathic Medical College, 1896, and the University of Illinois College of Medicine, 1905. Licensed in California in 1925. Doctor Plank was a retired member of the San Francisco Medical Society and the California Medical Association, and an associate member of the American Medical Association.

✤

SWEET, CLIFFORD DANIEL. Died in Oakland, October 7, 1957, aged 72, adenocarcinoma, metastatic to the liver. Graduate of the University of California School of Medicine, Berkeley-San Francisco, 1912. Licensed in California in 1912. Doctor Sweet was a retired member of the Alameda-Contra Costa Medical Association and the California Medical Association, and an associate member of the American Medical Association.

✤

VAN FLEET, HARRY D. Died in Ojai, September 11, 1957, aged 66. Graduate of Baylor University College of Medicine, Houston, Texas, 1919. Licensed in California in 1919. Doctor Van Fleet was a retired member of the Los Angeles County Medical Association and the California Medical Association, and an associate member of the American Medical Association.

California Medical Association

1958 *Annual Session*

AMBASSADOR HOTEL, LOS ANGELES — *April 27-30*

THREE POSTGRADUATE COURSES
MONDAY
TUESDAY
WEDNESDAY
9:00 a.m.-noon

Liver Diseases—A NINE-HOUR COURSE
U.S.C. SCHOOL OF MEDICINE

Abdominal Pain—A NINE-HOUR COURSE
U.C.L.A. SCHOOL OF MEDICINE

Management of Trauma—A NINE-HOUR COURSE
COLLEGE OF MEDICAL EVANGELISTS

A FEE WILL BE CHARGED FOR THE ABOVE COURSES

FOUR DAYS

GENERAL SCIENTIFIC MEETINGS
TECHNICAL EXHIBITS · SCIENTIFIC EXHIBITS
MEDICAL MOTION PICTURES

*

PRESIDENT'S DINNER DANCE

TUESDAY, APRIL 29
COCOANUT GROVE, AMBASSADOR HOTEL

*

HOUSE OF DELEGATES

SUNDAY, APRIL 27 AND WEDNESDAY, APRIL 30

REGISTRATION DAILY · 9:00 a.m. to 5:00 p.m. · NO REGISTRATION FEE

Please make hotel room reservations only through C.M.A. office in San Francisco
(A reservation form will be published in later issues of California Medicine)

Nurse Recruitment

NURSING today offers to women a variety of career opportunities surpassed by few professions. Nurses are employed in hospitals and public health agencies, business and industry, schools and universities, government agencies and departments, and in other health services. Although there are more nurses active in the profession today than ever before, many more are needed to meet the minimum health needs of our nation. The rapid growth of health insurance plans has brought about great increases in the numbers of people cared for in hospitals. New drugs and treatments have shortened the hospital stay, necessitating increased intensity and skill in the nursing care required during hospitalization.

What can be more rewarding than giving and serving when needed? This has been the privilege of thousands of members of the Woman's Auxiliary—to work with the youth of today, through our nurse recruitment program.

One of our functions is that of providing accurate and up-to-date information pertaining to nursing and nursing education, not only to students interested in nursing, but to school personnel including student counselors. Nurse recruitment was conceived fundamentally as a means of guiding young people to become educated as to the prospects for service in the choice of a career. We are all greatly concerned with the future of the nursing profession, the growth of which can be assured through a careful selection of the persons who will find professional service one of the chief ingredients of a satisfying life.

Realizing that financial difficulties often are one of the reasons why the profession is deprived of fine nurses, our Auxiliaries first established an extensive scholarship and loan program. Then we branched into recruitment, and then into sponsorship of Future Nurse Clubs. With all of this "teamwork" we now turn our thoughts to projects within the Future Nurse Clubs, such as "GEMS" (good emergency mother substitutes) which will undoubtedly be the next step in our program. This will enable the teenager to learn safety measures and cope with emergencies; it gives valuable information on infant and child care, on dangerous objects to be avoided, and on necessary procedures for acting in an emergency. In addition to teaching protection of the child, it stresses precautions to safeguard the "sitter."

The Nurse Recruitment history began in 1951 with the organization of the Student Nurse Recruitment Committee of California. It was financed and created by the California Medical Association, the California Hospital Association, and the then three large nursing organizations. Two half time directors were employed, one in the north and one in the south. They did much of the contact work, writing to schools of nursing, to medical auxiliaries, to public health nurses and to school counselors. In the beginning they often organized panels and acted as moderators. The committee had three functions: (1) to work in cooperation with interested and allied professions in the recruitment of nurses, (2) to safeguard the standards of the profession by interpretation, education and guidance in the recruitment program, and (3) to encourage service organizations to establish student nurse scholarships. In the spring of 1953 the Student Nurse Recruitment Committee was dissolved, and the first meeting of the California League for Nursing's Committee on Careers in Nursing was held.

All recruitment activities of the county society Auxiliaries are first cleared through the superintendent of schools or the board of education of the county. If they are not familiar with the program, the recruitment chairman explains our objectives and outlines our activities.

It is only because of the complete cooperation of the Auxiliary and the Careers Committee that the recruitment program functions so successfully. The National Auxiliary commends us most highly for our great contribution to recruitment, not only for the California program, *per se*, but because our results were so outstanding that our program is copied in other states and in Alaska and Hawaii.

Our Auxiliaries this past year have given 228 nursing scholarships, and are now sponsoring over ninety Future Nurse Clubs—an excellent record when one realizes that there are 154 clubs in California with 138 receiving assistance from the Auxiliary.

It is difficult to evaluate a program of such long range proportions. Increased enrollments in schools of nursing and comments of school directors indicate the positive results of recruitment. As schools open their doors this fall of 1957 teachers groan under a student load greater than they have ever had before. Worried communities and school officials are concerned over time, space and teachers to educate the largest junior and senior high school classes in history. Recruitment workers are concerned too, as it is predictable that the increase in enrollment will bring about changes in methods of recruitment. Career activities must be planned and carried out with the problems of the high schools in mind if boys and girls are to have the guidance they need in selecting careers wisely, and if nursing is to attract the best qualified students.

MRS. LEONARD D. OFFIELD
President, Woman's Auxiliary to the California Medical Association

NEWS & NOTES

NATIONAL · STATE · COUNTY

LOS ANGELES

Dr. Clayton G. Loosli, professor of Medicine and chief of the section of preventive medicine at the University of Chicago, has been appointed **dean of the University of Southern California School of Medicine.** He will assume the office in July next year.

Dr. Loosli succeeds Dr. Gordon E. Goodhart, who resigned as dean in March of 1956 to enter the private practice of psychiatry. Since that date, the School of Medicine has been directed by an interim administrative committee under the chairmanship of Dr. Thomas H. Brem.

* * *

Dr. Wilbur Bailey, Los Angeles, was elected chairman of the executive council of the American Roentgen Ray Society at the 58th annual meeting of the society last month in Chicago.

SAN DIEGO

Dr. Sidney B. Clark has been appointed assistant director of public health of San Diego County to take the place of Dr. Alvin R. Leonard, who resigned to become health officer for the City of Berkeley and clinical professor of public health at the University of California School of Public Health.

SAN FRANCISCO

Some 250 physicians attended the **Symposium on Alcoholism** at headquarters of the San Francisco Medical Society, September 28. Every aspect of alcoholism was covered by the American Medical Association's Committee on Alcoholism, marking the first time that this committee had ever attended a regional meeting. Sponsored by the A.M.A., the California Medical Association and the San Francisco Medical Society, the meeting was pronounced an outstanding success by all physicians.

* * *

Announcement of the appointment of **Dr. Rodney R. Beard,** professor of preventive medicine at Stanford University School of Medicine, to a four-year term on the National Advisory Heart Council was made recently by Surgeon General L. E. Burney of the U. S. Public Health Service. The council advises the Public Health Service and the National Heart Institute on research programs and other matters concerned with the control of heart disease.

* * *

The first annual convention of the **American Association of Medical Assistants,** which was held in San Francisco, October 4 to 6, was attended by 410 members and guests from all over the United States. This exceeded all expectations.

Mrs. Mary Kinn of Pasadena was installed as the organization's president. New directors included Mrs. Lillie Woods, of San Francisco, who is also president of the California Medical Assistants Association.

A feature of the meeting was the "California Night" reception at the Top of the Mark, held at the end of the first day, under the sponsorship of the California Medical Association, the San Francisco Medical Society and the American Medical Association.

* * *

A grant of $12,984 to Stanford University School of Medicine in support of **research on muscular dystrophy** was announced recently by the Muscular Dystrophy Associations of America. The Stanford Research project is being conducted by Dr. Laurens P. White, an instructor in the medical school.

GENERAL

The International Academy of Proctology has announced its annual cash prize and certificate of merit award contest for 1957-1958. The best unpublished contribution on proctology or allied subjects will be awarded $100 and a certificate of merit.

The formal award of the first prize and presentation of other certificates will be made at the annual convention of the International Academy of Proctology which is to be held April 11, 1958, at Hotel Del Prado, Mexico City.

The International Academy of Proctology reserves the exclusive right to publish all contributions in its official publication. All entries are limited to 5,000 words, must be typewritten in English, and submitted in five copies. They must be received no later than the first day of February, 1958. Further information may be obtained from Alfred J. Cantor, M.D., international secretary, International Academy of Proctology, 147 41 Sanford Avenue, Flushing New York.

* * *

The opening of its annual **essay contest for undergraduate medical students** has been announced by the American College of Chest Physicians. Cash awards of $500, $300, and $200 will be given as first, second and third prizes. The essays may be written on any facet of the diagnosis and treatment of diseases of the chest—heart or lungs or both.

First prize winner last year was James T. Post, a student at University of California School of Medicine, whose subject was "The Incidence of Pulmonary Tumors in Mice Exposed to Aerosols of Therapeutic Agents."

* * *

Mr. Anthon B. Robertson, formerly an executive with Sears, Roebuck and Company and Pacific Coast Paint and Varnish Company, has been named **president of California Physicians' Service.** Mr. Robertson succeeded Dr. T. Eric Reynolds of Oakland. Dr. Reynolds, who formerly held both positions, remains chairman of the board of trustees.

* * *

The American Goiter Association again is offering the **Van Meter Prize Award** of $300 and two honorable mentions for the best essays submitted concerning original work on problems related to the thyroid gland. The award will be made at the annual meeting of the association which will be held in the St. Francis Hotel, San Francisco, June 17, 18, and 19, 1958, provided essays of sufficient merit are presented in competition.

The competing essays may cover either clinical or research investigations, should not exceed 3,000 words in length and must be presented in English. Duplicate typewritten copies, double spaced, should be sent to the secretary, Dr. John C. McClintock, 149½ Washington Avenue, Albany 10, New York, not later than February 1, 1958.

A place will be reserved on the program of the annual meeting for the presentation of the winning essay by the author if it is possible for him to attend.

POSTGRADUATE EDUCATION NOTICES

THIS BULLETIN of the dates of postgraduate education programs and the meetings of various medical organizations in California is supplied by the Committee on Postgraduate Activities of the California Medical Association. In order that they may be listed here, please send communications relating to your future medical or surgical programs to: Mrs. Margaret H. Griffith, Director, Postgraduate Activities, California Medical Association, 417 South Hill Street, Los Angeles 13.

UNIVERSITY OF CALIFORNIA AT LOS ANGELES

Surgical Anatomy. Mondays, November 18 through February 3. Twenty hours. Fee: $80.00.

Arthritis and Rheumatism. Wednesday, January 15, 1958. Nine hours. Fee: $30.00.

Management of Surgical Emergencies. Thursday, January 23, 1958. Six hours.†

Contact: Thomas H. Sternberg, M.D., Assistant Dean for Postgraduate Medical Education, U.C.L.A., Los Angeles 24. BRadshaw 2-8911, Ext. 202.

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

Symposium in Cardiovascular Disease. Santa Rosa, Wednesday, November 20. Seven hours. Fee: $15.00.

Ocular Manifestations of Systemic Disease. Wednesday to Saturday, December 4 to 7. 24 hours.†

Clinical Cardiovascular Physiology. Friday to Sunday, December 13 to 15. Twenty-one hours. Fee: $30.00.

Psychiatry. Mount Zion Hospital, Thursday to Sunday, January 9 to 12.*

Newborn and Premature (Physicians). Monday and Tuesday, January 13 and 14. Fourteen hours. Fee: $40.00

Newborn and Premature (Nurses). Wednesday, January 15. Seven hours.†

Ophthalmoscopy in General Practice and Pediatrics. Wednesday and Thursday, January 15 and 16, 1958. Fourteen hours.†

Postgraduate Dermatology Clinic. Friday and Saturday, January 17 and 18, 1958. Fourteen hours.†

Nontraumatic Emergencies. Franklin Hospital, Friday and Saturday, January 17 and 18. Fourteen hours. Fee: $40.00.

Seminars in Hematology. Children's Hospital, Saturday, January 25. Seven hours. Fee: $12.50.

Patho-Physiology of the Gastrointestinal Tract. Monday and Tuesday, January 27 and 28, 1958. Fourteen hours.†

Postgraduate Seminars in Pharmacy. Thursday to Saturday, February 13 to 15. Fifteen hours. Fee: $25.00.

Course for Physicians in General Practice. Monday through Friday, February 24 to 28, 1958. Thirty-two hours.†

†Fee to be announced.
*Hours and Fees to be announced.

Children's Hospital Medical Seminar. Saturday, March 29.*

Fundamental Principles of Radioactivity and the Diagnostic and Therapeutic Uses of Radioisotopes. Two or three month course limited to one enrollee per month. Per month, $250.00.

Contact: Seymour M. Farber, M.D., Head, Postgraduate Instruction, Office of Medical Extension, University of California Medical Center, San Francisco 22. MOntrose 4-3600, Ext. 665.

STANFORD UNIVERSITY SCHOOL OF MEDICINE

Morning Clinical Conferences, each Monday, Room 515. *Contact:* D. H. Pischel, M.D., Professor, Division of Ophthalmology, Stanford University School of Medicine, 2398 Sacramento St., San Francisco 15.

UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES

Cardiac Resuscitation. Sponsored by the Los Angeles County Heart Association each Wednesday throughout the year, 4 to 6 p.m. Residents admitted without fee. Tuition for all other physicians: $30.00. (Each session all-inclusive.)

Basic Home Course in Electrocardiography. One year Postgraduate Series, electrocardiogram interpretation by mail. Physicians may register at any time and receive all 52 issues. Fifty-two weeks. Fee: $100.00.

Advance Home Course in Electrocardiography. One year postgraduate series, electrocardiogram interpretation by mail. Fifty-two issues: $85.00. Physicians may register at any time.

Contact: Phil R. Manning, M.D., Director, Postgraduate Division, University of Southern California School of Medicine, 2025 Zonal Avenue, Los Angeles 33. CApital 5-1511.

COLLEGE OF MEDICAL EVANGELISTS

Vue-Vox Postgraduate Refresher Courses. Courses are made up of four or more half-hour lectures each, recorded on hi-fi magnetic tape and illustrated by 35-mm. filmstrips or slides in full color, and adapted for use on any standard tape recorder and filmstrip or slide projector, automatic or manual.

Contact: Paul D. Foster, M.D., chairman, Committee on Audio-Visual Courses, College of Medical Evangelists School of Medicine, 316 North Bailey St., Los Angeles 33.

CALIFORNIA MEDICAL ASSOCIATION POSTGRADUATE COURSES

POSTGRADUATE INSTITUTES—1958

SAN BERNARDINO, RIVERSIDE AND ORANGE COUNTIES, in cooperation with College of Medical Evangelists, Arrowhead Springs Hotel, San Bernardino County, February 13 and 14, 1958. Chairman: Elmer O. Carlson, M.D., 756 N. Euclid Ave., Ontario.

WEST COAST COUNTIES, in cooperation with UCLA School of Medicine, Golden Bough Theater and La Playa Hotel, Carmel, March 6 and 7, 1958. Chairman: Howard C. Miles, M.D., 535 E. Romie Lane, Salinas.

San Joaquin Valley Counties, in cooperation with Stanford University School of Medicine, Hotel Californian, Fresno, March 20 and 21, 1958. Chairman: Henry L. Tiesche, M.D., 1759 Fulton St., Fresno.

North Coast Counties, in cooperation with USC School of Medicine, Hoberg's Resort, Lake County, April 10, 11 and 12, 1958. Chairman: Alfred A. Thurlow, Jr., M.D., 185 Sotoyome Ave., Santa Rosa.

Contact: One of the chairmen listed above, or Mrs. Margaret H. Griffith, Director, Postgraduate Activities, California Medical Association, 417 So. Hill Street, Los Angeles 13. Madison 6-0683.

* * *

Audio Digest Foundation, a nonprofit subsidiary of the C.M.A., now offers (on a subscription basis) a series of hour-long tape recordings designed to keep the physician abreast of current happenings in his particular field. Composed of practice-useful abstracts from 600 leading journals, with short lectures and editorial comments from prominent physicians, Audio Digest offers programs covering general practice, surgery, internal medicine, obstetrics and gynecology, and pediatrics.

Contact: Claron L. Oakley, editor, 1919 Wilshire Blvd., Los Angeles 57.

Medical Dates Bulletin

NOVEMBER MEETINGS

Society Graduate Internists Annual Symposium, November 15 to 17, Statler Hotel and Los Angeles County General Hospital. *Contact:* Wallace Frasher, M.D., secretary, 1200 N. State St., Los Angeles.

State Board of Medical Examiners Oral Examination, November 16, San Francisco.‡

State Board of Medical Examiners Oral and Clinical Examination for Foreign Graduates, November 17, San Francisco‡

Sonoma County Heart Association Fourth Annual Symposium on Cardiovascular Disease, November 20, 9 a.m., Santa Rosa. *Contact:* Jack Froom, M.D., chairman, 210 Fourth St., Petaluma.

Western Division of American Psychiatric Association in conjunction with West Coast Psychoanalytic Societies, November 20 to 24, Hotel Statler, Los Angeles.

DECEMBER MEETINGS

Fourth Bahamas Medical Conference, Fort Montagu Beach Hotel, Nassau, Bahamas, December 1 to 15. *Contact:* B. L. Frank, M.D., 1290 Pine Ave., West, Montreal, Canada. Reservations made through Mr. John L. Cota, general manager, Fort Montagu Beach Hotel.

Monterey County Heart Association Symposium on Heart Disease Fourth Annual Postgraduate Meeting, December 5 and 6, House of Four Winds, Monterey. *Contact:* Mrs. Joseph R. Costa, executive secretary, Box 1329, Monterey.

American College of Chest Physicians Postgraduate Course on Diseases of the Chest, Ambassador Hotel, Los Angeles, December 9 to 13. *Contact:* Alfred Goldman, M.D., chairman, 416 N. Bedford Drive., Beverly Hills.

‡Contact: Louis E. Jones, M.D., 1020 N Street, Sacramento 14.

1958 MEETINGS

California Conference on Rural Health Annual Meeting, Bakersfield Hacienda, Bakersfield, January 21 and February 1. *Contact:* Glenn Gillette, California Medical Association, 450 Sutter St., San Francisco 8.

Orange County Heart Association 1958 Annual Symposium on Heart Disease, January 25, all day, Disneyland Hotel, Anaheim. *Contact:* Howard G. Buswell, executive director, P. O. Box 1704, Santa Ana.

Colorado State Medical Society Midwinter Clinical Session, February 18 to 21, Shirley-Savoy Hotel, Denver. *Contact:* Harvey T. Sethman, executive secretary, 835 Republic Bldg., Denver 2.

Los Angeles Radiological Society Tenth Annual Midwinter Conference, Biltmore Hotel, Los Angeles, February 22 and 23, 9:30 a.m. *Contact:* John H. Eaton, M.D., secretary-treasurer, 65 N. Madison Ave., Pasadena 1.

International College of Surgeons 23rd Annual Congress of U. S. and Canadian Sections 11th Biennial International Congress, March 9 to 13, Hotel Ambassador, Los Angeles. *Contact:* J. M. de los Reyes, M.D., general chairman, 2010 Wilshire Blvd., Los Angeles 57.

California Society of Plastic Surgeons Annual Meeting, March 20 to 22, Del Monte Lodge, Del Monte, California. *Contact:* Benjamin F. Edwards, M.D., 2200 Santa Monica Blvd., Santa Monica.

Valley Children's Hospital Spring Clinics, April 11 and 12. Roosevelt High School Auditorium, Fresno. *Contact:* Valley Children's Hospital, Fresno.

American College of Obstetricians and Gynecologists, April 21 to 23, Los Angeles. *Contact:* John C. Ullery, M.D., secretary, 15 South Clark St., Chicago 3.

American Academy of Pediatrics Annual Spring Session, Hotel Statler, New York City, April 21 to 23. *Contact:* W. J. Becker, business manager, 1801 Hinman Ave., Evanston, Ill.

California Medical Association Annual Meeting, Ambassador Hotel, Los Angeles, April 27 to 30. *Contact:* John Hunton, executive secretary, 450 Sutter St., San Francisco 8, or Ed Clancy, director, Public Relations, 417 South Hill St., Los Angeles 13.

South Dakota Medical Association Annual Meeting, May 17 to 20, Huron, South Dakota. *Contact:* John C. Foster, executive secretary, 300 First National Bank Building, Sioux Falls, S. D.

Western Branch, American Public Health Association Annual Meeting with Canadian Public Health Association, May 18 to 23, Vancouver, B. C. *Contact:* Mrs. L. Amy Darter, secretary-treasurer, 2151 Berkeley Way, Berkeley 4.

American Laryngological Association, May 19 to 20, San Francisco. *Contact:* James H. Maxwell, M.D., secretary, University Hospital, Ann Arbor, Michigan.

American Broncho-Esophagological Association, May 21 to 23, San Francisco. *Contact:* F. Johnson Putney, M.D., secretary, 1719 Rittenhouse Square, Philadelphia, Pa.

California Heart Association Annual Meeting, Scientific Session and Directors Meeting, Hacienda Motel, Fresno, May 23 to 25. *Contact:* J. Keith Thwaites, executive director, 1428 Bush St., San Francisco.

American College of Chest Physicians 24th Annual Meeting, June 18 to 22, San Francisco. *Contact:* Mr. Murray Kornfeld, executive director, 112 East Chestnut St., Chicago 11, Ill.

INFORMATION

You Can Help Medical Education Pay Its Own Way

THOMAS J. CUNNINGHAM, General Counsel, University of California

AMERICA'S MEDICAL SCHOOLS are in serious financial trouble. The reasons are apparent: (1) enrollments have increased sharply, (2) medical education costs have skyrocketed, (3) income has lagged, and (4) some of the best faculty members are being lured away from teaching and research by better salary offers elsewhere.

The situation would be much worse if it were not for an abundant shower of gifts from philanthropic foundations, federal and state governments, business and industry, and generous individuals. Such gifts range all the way from the Ford Foundation's splendid donation of $90,000,000 last year in support of privately endowed medical schools to a crumpled envelope containing two $1 bills and an anonymous note, "For cancer research," received by a West Coast university.

But a curious fact was noted in the 1956 annual report of the National Fund for Medical Education: While contributions from corporations and foundations increased substantially, *contributions from individual physicians decreased.*

Why should this be? Members of the medical profession are more keenly aware of the plight of our medical schools than anyone else.

In my position I have examined many gifts for educational purposes. I have talked to numerous individuals desiring to contribute funds in ways that would accomplish the most good.

In my opinion the average physician is not as aware of the legal techniques of philanthropy as is the average businessman or corporation. In other words, he is uncertain of what steps to take to aid medical education and at the same time obtain substantial tax benefits.

In this article, therefore, I propose to outline a few of the more important ways in which physicians can contribute to medical schools and at the same time realize substantial tax savings.

The medical profession can also help in another important way. Physicians are sometimes asked for suggestions by patients who wish to aid medical education. If the physician knows the several ways in which gifts can be made, he is in a much better position to assist his patients.

But first, let us examine in more detail the present crisis in medical education and the reasons behind it. America's 82 great medical schools today teach 29,000 medical students, graduating more than 6,800 annually. They train 11,500 graduate physicians, residents and interns, and give refresher courses to 21,500 physicians. They instruct 19,000 dental, pharmaceutical and nursing students—plus 8,000 nonmedical students. They annually provide 2,300,000 persons with medical care (valued at $115,000,000). And finally, they furnish leadership and counsel for hundreds of health agencies.

But with a national population growth of more than 2,500,000 persons annually—a net gain of 7,000 a day—America's medical schools are being called upon to supply a larger number of professional health experts and a greater volume of medical care than ever before.

From 1910, when Dr. Abraham Flexner's famous report led to the overhauling of America's medical schools, medical education has been in an ever-challenging period of transition. Although we have forged to world leadership in medicine, our financial resources in support of it have not kept pace. In most cases a medical school will consume from 30 to 40 per cent of the parent university's income—yet enroll only about 10 per cent of the students.

According to the Association of American Medical Colleges, the estimated medial expense of a medical student is $2,178 per year in privately supported schools and $1,160 (resident) to $1,930 (nonresident) at tax-supported schools. More scholarships are badly needed so that medicine, as a career, will not be denied to any worthy young man or woman of great talent but modest means.

No other form of education is as expensive as medical education with its longer period of training, high ratio of teachers to students, new and complicated teaching techniques. Medical education is four to five times as expensive as general university education—a factor in keeping medical school salaries low. Because of this glaring fact, many of our most competent teaching and research men are being lost to industry, government and private practice.

Obviously, more money is needed to maintain medical education at its present level. Federal subsidy has been suggested, but experience has demonstrated that this method could effect controls over teaching programs and professional practices that might be detrimental to the good of the nation.

While President of Columbia University in 1949, and recognizing that "medical education is a national problem which should be met on a national basis," Dwight D. Eisenhower said:

"The financial problems of the medical schools

should be solved through private, rather than governmental, means. Excessive reliance on government violates the essential principle of our free enterprise system."

Business and industry are recognizing their obligations in maintaining America's health programs. But it is the physicians of America who must give more generously—as they give of their time and counsel in the tradition of Hippocrates—to train tomorrow's physicians.

Gifts to educational institutions are encouraged by both federal and state governments. In 1954 Congress increased such maximum allowable tax deductions from a previous 20 per cent to 30 per cent of adjusted gross income. The purpose of this increase was to provide additional funds to educational institutions in view of their rising costs and the relatively low rate of return received on endowment funds.

What are some of the ways by which physicians or their patients can accomplish the greatest good for the support of our nation's medical schools and at the same time realize maximum tax reductions themselves?

Briefly, here are a few of the many methods that have come to my attention during the past year that may be of most interest:

CASH GIFTS

The simplest way for you, as a physician, to make a gift to a medical school or a foundation is by a cash gift. However, you should be careful in making your charitable contributions to stay within 30 per cent of your adjusted gross income.

To illustrate, suppose you are unmarried and have a taxable income of $25,000 (after all deductions except the deduction for charitable contributions and before the personal exemption). You wish to make a gift of $7,500 to a college for its medical school. Ordinarily without the charitable deduction, you would pay a federal income tax of $9,796 on your earnings. With the gift of $7,500 you reduce the tax to $5,650. Therefore, the actual net cost of the $7,500 gift is $3,354.

Or let us suppose you are a married taxpayer filing a joint return with itemized deductions (other than educational, charitable and religious) of 10 per cent of adjusted gross income, and have an adjusted gross income of $75,000. Almost two-thirds of the cost of the maximum deductible gift of $22,500 to a medical school is borne by the Federal Government! The net cost of the $22,500 gift to you is only $8,733. Of course, because of graduated income tax rates, the savings are less for those of smaller income. However, if our hypothetical taxpayer has an adjusted gross income of $50,000, in this situation, the Treasury Department would in effect pay for more than half of the maximum deductible gift of $15,000. The net cost thereof to the donor would be but $7,110. And if we assume an adjusted gross income of $25,000 under otherwise similar circumstances, the maximum gift of $7,500 would actually cost the donor just over $5,000.

SHORT TERM TRUSTS

The short term trust is a device that has proved to be especially advantageous for physicians. Since the inclusion of this statutory exemption in the tax revision of 1954, many physicians have already established short-term educational trusts. Let me explain how this technique is used.

Let us imagine that you are a physician in your fifties in a relatively high income tax bracket at present, but foresee retirement or a later period in which your income will be lower. The use of the short-term educational trust is ideally suited for a person in such circumstances.

With the use of this method, you irrevocably convey assets in trust for a period of at least two years, but for a longer term if you wish, with instructions to pay the income to a particular university for its medical school, and at the end of the prescribed time to return the principal to yourself or your estate.

The advantage of such a trust is that for the years of the trust its income is excluded from your income but you have not parted with the principal permanently. Therefore, top-bracket income of small net worth is temporarily released; at the same time, the underlying assets are preserved for your or your family's later use.

The following situation will clarify this principle: Let us say you are a single person with a net taxable income of $75,000 and tax liability of $46,170. You establish a trust to exist for three years with property having an annual income of $10,000. For each year of your gift your income is reduced by $10,000 and your tax liability is lessened by $7,950. Thus, at the end of three years you have made a $30,000 gift at an actual cost to you of $6,150.

APPRECIATED PROPERTY

The savings that may be gained by giving appreciated property are great. If you have property (other than inventoriable items or assets held for ordinary business sale) which has increased in value, it is much to your advantage to make a gift of the property itself rather than to sell it and then to donate the proceeds. By giving the property, you can deduct its full present value, subject to the 20 per cent or 30 per cent limitation rules. However, you are not liable for any capital gains tax.

This can be made clearer by considering an example. Let us suppose you have a net taxable income

of $25,000 (after all deductions except the deduction for charitable contributions and before the personal exemption) and wish to give securities at present worth $7,500 that you obtained for $2,500 more than six months before. If you sell the stock, you would realize a long-term capital gain of $5,000 on which there would be a $1,250 capital gains tax. Thus, you have an actual net value in the securities of $7,500 less $1,250 or $6,250. If you were to give the $6,250 to a college for its medical school, your income would be reduced by approximately $3,516. Therefore, the school receives a $6,250 gift at an actual cost to you of slightly more than $2,730. However, if you give the stock to the medical school, you do not pay the capital gains tax and can deduct the full $7,500 as a charitable deduction. This deduction cuts your tax by $4,146. That amount plus the avoidance of the $1,250 capital gains tax reduces the actual cost of the gift of $7,500 to less than $2,105. And, remember, the medical school is benefited by the full $7,500.

In cases where the physician is in a higher tax bracket this technique of giving appreciated property to a medical school may be more advantageous to him in a financial sense than selling the same property and keeping the proceeds. To illustrate, let us assume that a physician, who is single, has an adjusted gross income of $150,000 and owns securities with a current market value of $50,000 which he acquired more than six months ago for $10,000. If he gives the stock to a medical school, he will ultimately end up with $4,500 more than he would have been able to retain had he sold it and kept the proceeds.

Conversely, if the property has depreciated in value and is of a kind on the sale of which one may legitimately claim a tax loss, it is more advantageous to sell it and then turn the proceeds over to the foundation or medical school in order to gain the maximum tax savings.

TESTAMENTARY GIFTS

Ordinarily it is more advantageous for tax purposes for a donor to make a living gift than to make a gift by will. Oliver Wendell Holmes humorously expressed such a thought when he wrote:

"Learn to give
Money to colleges while you live.
Don't be silly and think you'll try
To bother the colleges, when you die,
With codicil this, and codicil that,
That knowledge may starve while the Law grows fat;
For never was pitcher that wouldn't spill,
And there's always a flaw in a donkey's will."

However, death tax advantages are substantial for a physician who includes medical schools or foundations in his will.

The estate tax deduction for charitable gifts reduces the actual cost of donations. This amount comes off the top of the estate, eliminating it from the impact of the highest rate of taxation.

To illustrate, let us assume that upon your death you have a taxable estate of $200,000 and have provided for a $25,000 bequest to a medical school. The federal estate tax would be reduced by $7,500. This means that the actual cost to your estate of the $25,000 gift is $17,500. Naturally the tax savings are greater in larger estates.

Of course, the types of gifts that I have mentioned are just a very few of the many techniques that might be used. And there are innumerable possible variations of each, depending on your individual wishes and circumstances. Perhaps a testamentary trust might be best for you or a gift by life insurance, or maybe you should consider giving by will certain real property that would be difficult to sell for appraised value, in order to eliminate it from your taxable estate. Your tax adviser can assist you in making the proper choice.

The tax savings referred to above are savings in federal taxes only. Contributions to medical schools are also deductible for California income tax purposes subject to prescribed statutory limitations and likewise are deductible under the California Inheritance Tax Law.

Here is one suggestion that I cannot emphasize too strongly: *When investigating the form which the benefaction should take, or in drafting the proper instrument of conveyance, by all means consult an attorney, a tax expert or an officer of the medical school or foundation of your choice.*

How much are American physicians now giving toward medical education? In 1956 a total of more than $3,000,000 was given in two ways: (1) approximately $2,000,000 was given by physicians directly to the nation's 82 medical schools, and (2) another $1,000,000 was contributed through the American Medical Education Foundation. Until last year, the A.M.E.F. channeled its funds through the National Fund for Medical Education (a business and industry fund-raising organization). In the future, however, the A.M.E.F. will make its own distribution of funds.

It has been variously estimated that the additional income needed annually by our medical schools is from $10,000,000 to $40,000,000.

Your individual contribution will help medical education pay its own way and yield rich dividends in better health and new victories over disease. All Americans have a stake in the future of medical education—but you, as a physician, have the greatest stake of all.

128 Administration Building, University of California, Berkeley 4.

Medical Professional Liability

The following special report by the law department of the American Medical Association on medical professional liability was approved by the Board of Trustees and transmitted to the A.M.A. House of Delegates at the 1957 annual meeting for its information. The board also voted that the recommendations made by the law department be approved and implemented.

The report was referred to Reference Committee on Insurance and Medical Service, which approved the recommendations; and the Reference Committee's report then was adopted by the House.

SPECIAL REPORT OF THE LAW DEPARTMENT

Introduction

AT ITS MEETING in December, 1954, the Board of Trustees requested the law department to review previous actions of the American Medical Association with respect to medical professional liability and to plan and initiate any necessary additional studies. This action by the board was taken in response to a number of resolutions presented to the House of Delegates by state medical societies requesting advice and assistance in this field. After consultation with the staff of the Council on Medical Service and the Committee on Professional Liability of the Committee on Medicolegal Problems, it was determined that further investigation and study was necessary and desirable.

It was recognized at the outset that two approaches to the study were available. We could say as little as possible about the subject for fear of stimulating additional claims or we could plan a program designed to educate the members of the profession concerning accident and claims prevention and alert them to the pitfalls and occupational hazards in the practice of medicine. It was and is our belief that only by facing up to the facts of the past and present concerning medical professional liability can the profession intelligently plan ways and means to cope with this problem in the future.

Since the initiation of its study, the law department has submitted three progress reports to the Board of Trustees: one in May, 1955, one in November, 1955, and the most recent in May, 1956. This report is intended to summarize the most significant results of our study up to the present time.

For approximately two years, facts, figures, and opinions have been collected. This material has been reviewed, studied, and analyzed. It is hoped that the results will add to existing knowledge in the field and will provide the basis for workable and effective professional liability claims prevention programs.

Because of some of the conclusions and recommendations contained in this report it has been identified as "confidential." It is a matter for the board's discretion as to whether all or parts of it should be released.

Scope of the Study

The following projects have been completed and the results have been published in the *Journal.*

(a) *State Regulations.* A questionnaire was prepared jointly with the Council on Medical Service and sent to each state insurance commissioner for the purpose of obtaining authoritative information regarding the regulation and control of professional liability insurance rates.

(b) *Survey of State Medical Societies.* A questionnaire was sent to all of the state medical societies and the medical societies of the District of Columbia, Hawaii, and Alaska to obtain the opinion of society officials concerning such subjects as: The average amount of coverage and the availability of professional liability insurance, the most prevalent problems in the field, and the status of claims prevention programs.

(c) *State Statutes of Limitation.* A detailed study has been made of the statutes of limitation of each state relating to medical professional liability.

(d) *Analysis of Reported Cases.* A review has been made of medical professional liability court cases on which official reports have been published from 1935 through 1955. The analysis of these reported cases indicates the geographic areas in which professional liability cases occur most frequently, the types of medical procedures involved, the circumstances which caused the suits to be filed, and their disposition.

(e) *Government Physicians.* An analysis has been made of professional liability claims involving physicians in all branches of federal government service.

(f) *Survey of National Medical Societies.* A questionnaire inquiring as to available group insurance programs or other similar arrangements was sent to and completed by 13 national medical societies.

(g) *Opinion Survey of Physicians.* A questionnaire was sent to approximately 7,500 members of the American Medical Association, representing a random sample of about 5 per cent of the membership. Of these questionnaires 71.2 per cent or 5,341 were completed and returned. Opinions were requested on various aspects of medical professional liability and inquiry was made as to whether a professional liability claim has ever been brought against them. A second questionnaire requesting detailed information was sent to those physicians who indicated that a professional liability claim or suit had been brought against them.

(h) *Special Articles.* The preparation and publi-

cation of a series of articles on various aspects of medical professional liability, entitled: The History of Professional Liability Suits in the United States; Expressing Opinions as to Former Treatments; Put It in Writing, Doctor; Medicolegal Hazards of Anesthesia; Hazardous Fields of Medicine in Relation to Professional Liability; Res Ipsa Loquitur—Liability Without Fault; Rule of Respondeat Superior; Professional Liability Insurance: Amount of Coverage; and Professional Liability Claims Prevention.

The above categories of inquiry form the basis for this report. In conducting this study our hypothesis has been that most professional liability claims can be prevented if knowledge of the causes of past claims is put to intelligent use. The information we have obtained, thus far, confirms this belief. Although we have not exhausted all possible sources of information we have learned a great deal about professional liability and the causes of claims.

The Law of Professional Liability

Although this report is primarily concerned with the legal duty of the physician to avoid injury to his patient we also of necessity have given some consideration to the physician's ethical, moral, and social responsibilities in the practice of medicine. Generally, the fulfillment of these responsibilities will serve to satisfy the obligations which the law imposes upon the physician.

It is a general rule of law that a physician must possess that degree of medical knowledge and skill possessed by other physicians in his or a similar community engaged in a similar type of practice. He must also use his best judgment and reasonable and ordinary care in applying his knowledge and skill to the treatment of patients. The specialist or the man who holds himself out to the public as a specialist is required to possess and exercise that degree of care and skill commonly possessed by those engaged in the same specialty, in the same or similar community.

The Nature of the Problem

Patients who have sustained an unsatisfactory result and are aware that they have not received the *best* possible medical care are potential claimants. Where there is a poor medical result, merely fulfilling legal standards of care is sometimes not enough to prevent a claim. This usually is the case when the patient believes that the physician is not sufficiently sympathetic or if he considers the physician's fees to be excessive.

Professional liability cannot therefore be properly regarded as a legal problem exclusively. It is also a medical problem and one which in our opinion requires the same intensive study that the profession has devoted to the conquering of disease. The legal problems associated with medical professional liability can be dealt with adequately only if medicine will provide the type of emphasis to accident prevention and the utilization of already acquired knowledge as it does to scientific advancement. When effective means are discovered for reducing or minimizing medical professional liability problems it will be physicians who will lead the way by devising techniques that will minimize medical mistakes and patient dissatisfactions.

Availability of Professional Liability Insurance and Amount of Coverage

Without exception, all of the organizational representatives who replied to our medical society questionnaire indicated that medical professional liability insurance was available to the physicians in their state. Furthermore, all of them, except two, stated that it is not difficult to obtain. One indicated that physicians in certain specialties had difficulty, and another said that difficulties had been encountered by physicians who had a previous claim or suit brought against them.

In the survey of individual physicians, 92.3 per cent said that they carried professional liability insurance and 92.6 per cent said that the insurance was not difficult to obtain. Of those answering the questionnaire 56.4 per cent expressed the opinion that the cost of professional liability insurance is reasonable.

The limits of professional liability coverage appears to vary widely even within a state and within the different types of practice. According to the information supplied by medical society representatives the average (median) coverage across the country for general practitioners is $25,000 for one claim and $75,000 for all claims during the year; for surgeons and other specialists $100,000 and $300,000. There are at least 45 carriers writing medical professional liability insurance in the United States.

Effect of Professional Liability Claims on Physician's Reputation

A substantial majority of medical society representatives reported that in their opinion professional liability claims have little or no effect on the reputation and on the practice of the physician involved. A few medical society spokesmen explained that in the smaller communities in their area the effects of such claims and suits are more pronounced than in larger communities. Other responses indicated that the effects were greater when newspaper publicity was given to the case. A few responses explained that the effects were more adverse if the physician had previously been the subject of a professional liability claim or suit.

Incidence of Professional Liability Claims

Many medical society executives and individual physicians have, on numerous occasions in the past, expressed concern over what they describe as an "alarming" increase in the frequency of professional liability claims. It is unfortunate that insurance company records are either unavailable or inaccessible to determine the actual trend. Realizing that the individual physician may not be in a position to supply authoritative information as to whether there is, in fact, a rapid rise in the frequency of claims in his community, in the absence of more accurate data, we nevertheless feel that their opinions deserve consideration. According to our survey of physicians, only 29.7 per cent of the respondents to the question on this point were of the opinion that there has been an increase during the past five years. Of the respondents, 39.7 per cent felt that the incidence of claims had not increased. The remainder thought that claims had decreased or else they had no opinion.

In California, Louisiana, New York, Rhode Island, Utah, the District of Columbia, and Hawaii, there was a clear-cut expression of opinion that professional liability claims have increased in frequency during the past five years. For example, 59.7 per cent of the California physicians said that in their opinion there has been an increase.

Validity of Claims

Our study of reported court decisions and the survey of physicians who stated that a claim had been brought against them indicates that approximately 50 per cent of the claims and suits could not be sustained legally. There were, however, a considerable number of instances reported in which a claim was brought against a qualified physician which involved either actual negligence in treatment or a substantial basis on which a patient could reasonably believe he suffered from the negligence of a physician. In a few instances it appeared that the claims were either fraudulent or so wholly lacking in foundation as to compel the inference that the patient was acting in bad faith.

Many physicians consider the problems of professional liability as a matter of academic interest. The fact is that professional liability claims are *not* limited to a small group of "malpractice prone" doctors. Among the physicians who indicated that they had experienced claims, 86.5 per cent incurred only one claim in their entire professional practice. Only 10.5 per cent of the physicians who reported claims had two claims in their entire professional practice; 1.9 per cent, three claims; and 1.1 per cent, four claims. Our figures indicate that professional liability is the problem of the many, not the few.

In a number of cases which were resolved in favor of the physician because of technical legal grounds it is possible that the verdict would have been against the defendant had the case been decided on its medical merits. On the other hand, there was a significant number of cases involving the doctrine of "res ipsa loquitur" (the thing speaks for itself) wherein the courts assumed negligence solely because there was no medical explanation for an unsatisfactory result.

Professional Liability Claims Review Committees

The executives of thirty-one state medical societies indicated that a claims review program has been established in their state either on a state or county level. The usual procedure followed by these committees is this: When a claim is reported, the physician involved is called in to meet with the committee. The committee attempts to determine whether the claim is legitimate and whether there is evidence of actual professional liability. If the physician has been careless or unethical or has undertaken procedures beyond his competence, he and the insurance carrier are advised to settle the case. If the negligence of the physician is not apparent every legitimate effort is made to encourage or assist in the defense of the case.

We feel that these committees can render a real service to the public and the profession by indirectly improving the quality of patient care, and in the discouragement of invalid or nuisance claims. Such committees should not attempt to usurp the function of courts in the adjudication of claims nor interfere in the normal relationship between the physician and his insurance carrier.

Professional Liability Claims Prevention Programs

Although only 21 state medical societies reported that they have a claims prevention program, 73.9 per cent of the physicians polled believe that such programs perform a valuable function. Of the physician respondents, 23.7 per cent said that a claims prevention program is now offered by their *county* medical society. Of this number, 76.1 per cent rated their county program as either adequate or excellent.

It appears from these figures and from the fact that 76.3 per cent of the physicians reported the absence of claims prevention programs in their county medical society that there is a nationwide need and a desire on the part of the medical profession to stimulate the initiation of such programs.

If properly planned and implemented such programs have a twofold objective: The prevention of medical accidents which lead to claims and the prevention of unwarranted claims—in brief, the improvement of medical service.

Claims Statistics

The following are some of the significant statistics concerning professional liability claims as shown by our survey of physicians:

(a) 14.1 per cent or approximately 1 out of every 7 physicians responding to our questionnaire experienced professional liability claims during his professional medical career.

(b) 53.7 per cent of those who have had *claims* said that the claims were brought against them since 1950.

(c) 43 per cent said that the *alleged act* of malpractice occurred since 1950.

(d) Thirty-four years was the approximate median age of patient bringing the claim.

(e) 55 per cent of the claimants were female, but 10 states had more male than female claimants, and 6 states had about the same number of female and male claimants.

(f) 72.5 per cent of the physician respondents who had claims reported that they had personally performed the treatment or act of alleged malpractice.

(g) 67.2 per cent of the incidents of alleged malpractice occurred in hospitals, 23.9 per cent in the physician's office, 6.3 per cent in the home of patient, and the remaining 2.6 per cent occurred elsewhere in such places as factories, or the place of the incident was not stated by the respondent.

(h) 30.9 per cent of the claims involved surgery, 20.0 per cent medicine, 19.7 per cent orthopedics, 12.5 per cent obstetrics and gynecology, 6.2 per cent neuropsychiatry, 5.6 per cent anesthesiology, and the remaining 1.1 per cent were either too small to tabulate separately or were not stated by the respondent.

(i) The physicians who had 93.2 per cent of the claims reported that they had professional liability insurance at the time of the alleged incident.

(j) 28.9 per cent of the physicians against whom claims were brought are certified by an American specialty board.

(k) 50.4 per cent of the physicians against whom claims were brought stated that they were full-time specialists.

(l) Physicians experiencing claims said that they were in practice, on the average (median), about 13 years before they had a claim.

Conclusions

After studying the problems of medical professional liability for the past two years our basic conclusion is that most claims are preventable and not inevitable. We feel that our analysis of professional liability cases and claims and the surveys we have conducted warrant the following specific conclusions:

(a) An element which is present in all professional liability claims is dissatisfaction arising out of the physician-patient relations. Many of the cases which actually involved substandard medical treatment would probably not have matured into claims had it not been for some other cause of friction between the patient and the physician.

(b) Professional liability, although varying in severity in different localities, is a national problem which transcends local boundaries. To be effective, a professional liability claims prevention program requires leadership at the national as well as the state and local levels.

(c) The objective of the medical profession is not the prevention of professional liability claims as such, but the prevention of avoidable errors and omissions that result in injury to the patient and stimulate litigation, and the discouragement of unfounded claims. To implement this objective there is need for (1) an intensive educational program which emphasizes the nonmedical as well as the medical causes for professional liability claim, and (2) the utilization of the self-disciplining resources of the medical profession in the prevention of medical accidents within and outside the hospital.

(d) Regardless of the safety measures that are taken, the ever-increasing complexities of modern medicine create possibilities for human errors and omission even among the most qualified and experienced practitioners.

(e) In the interest of the public as well as the profession, physicians who have demonstrated that they are careless, incompetent or unethical in the treatment of patients should be dealt with effectively through medical society, state licensure and hospital disciplines to prevent the recurrence of patient injury.

(f) An effective educational and accident prevention program should include not only physicians, but physicians' employees and the hospital personnel for whose acts the physician may be responsible.

(g) An effective prevention program should include periodic examinations of equipment to avoid mechanical failures, and the abandonment of obsolete and defective devices.

Recommendations

(a) Considering that more than 2 out of 3 of the incidents resulting in professional liability claims occur in hospitals, patient tort liability is now a matter of common interest and mutual concern between the medical profession and hospitals. It is suggested that the Board of Trustees consider the advisability

of entering into discussions with representatives of the American Hospital Association with the objective of formulating and implementing an effective in-hospital safety and accident prevention program.

(b) We recommend that this report be called to the attention of the American Medical Association's representative on the Joint Commission on the Accreditation of Hospitals for their consideration as to the feasibility of encouraging that organization's interest in the subject herein presented.

(c) That state and county medical societies be urged by the Board of Trustees and the House of Delegates to create or, if in existence, implement more effectively, Claims Prevention Programs. To facilitate the efforts of the state societies in this project the law department is forwarding to each state executive secretary all statistics pertaining to his state which have been collected during the course of the current survey.

(d) That state and county medical societies be encouraged to show the film on Medical Professional Liability prevention and to plan informational and educational programs on this subject at state and county meetings.

(e) That the Board of Trustees authorize the printing and distribution of the compilation of medicolegal forms and explanatory text material which has been developed by the law department.

(f) That the law department be authorized to conduct the second phase of the professional liability survey consisting of an opinion survey of selected attorneys and the judiciary, an analysis of available information concerning insurance experience and a survey of comparable fields of negligence actions.

For Your Patients—

Certainly, let's talk about fees...

In this day and age I think we all are faced with many similar financial problems. Though our incomes may be derived from different sources, our expenditures, for the most part, consist of food, clothing, shelter and other expenses including medical care.

As your personal physician, you realize my income is solely from my fees; fees which I believe to be entirely reasonable. However, should you ever have any financial worries, I am most sincere when I say that *I invite you to discuss frankly with me any questions regarding my services or my fees. The best medical care is based on a friendly, mutual understanding between doctor and patient.*

You've probably noticed that I have a plaque in my office which carries this identical message *to all my patients.* I mean it—

Sincerely,

_____, M.D.

MESSAGE NO 3. Attractive, postcard-size leaflets, you to fill in signature. Available in any quantity, at no charge as another service to CMA members. Please order by Message Number from CMA, PR Department, 450 Sutter, San Francisco. (If you do not have the plaque mentioned in copy, let us know and it will be mailed to you.)

THE PHYSICIAN'S *Bookshelf*

WILLIAM HARVEY—His Life and Times: His Discoveries: His Methods—Louis Chauvois. Philosophical Library, New York, 1957. 271 pages, $7.50.

In this year of Harvey celebration it is of interest to find a new book on the discoverer of the circulation by a Frenchman—and a very fine book it is! Chauvois realizes that medical history can only be written intelligently against the historical background of the time, and the first part of the book is really a sketch of the Jacobean, Commonwealth and Restoration periods interwoven with the life of Harvey vividly depicted. An account of the details of Harvey's discoveries occupies the later part of the work. The author is obviously a great admirer of his subject and one wonders at times whether he does not ascribe to Harvey's character a degree of perfection perhaps a little overdone. Aubrey, who is superficial and gossipy but nonetheless fairly reliable, says of him for example: "He understood Greek and Latin pretty well, but was no Critique, and he wrote very bad Latin. The Circuitis Sanguinis was, as I take it, done into Latin by Sir George Ent . . . All his profession would allow him to be an excellent Anatomist, but I never heard of any that advanced his Therapeutic way. I knew several practicers in London that would not have given 3 d. for one of his Bills; and that a man could hardly tell by one of his Bills what he did aime at."

At any rate Chauvois has done a splendid job and the book—an example of fine biographical style—gives us a vivid impression of Harvey and his times and at the end is put down with regret.

A. L. Bloomfield, M.D.

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SCIENCE LOOKS AT SMOKING—A New Inquiry Into the Effects of Smoking on Your Health—Eric Northrup—Introduction by Dr. Harry S. N. Greene, Chairman Department of Pathology, Yale University. Coward-McCann, Inc., 210 Madison Avenue, New York 16, N. Y., 1957. 190 pages, $3.00.

The relationship between chronic cigarette smoking and lung cancer in males continues to be a topic discussed more with emotion than with scientific detachment. While the author makes a valiant attempt to remain detached, one can detect emotional overtones, especially in quotations from the entertaining introduction written by the normally quite detached Professor Greene, chairman of the department of pathology at Yale University.

After this not inconsiderable introduction, in which Doctor Greene emphasizes the well-known fact that he has been able to produce experimental carcinoma in animals with many standard carcinogens such as coal tar and dibenzanthracene, but never with tobacco smoke, there are a series of nine chapters. These range from the wisdom or otherwise of smoking, facts pertinent to lung cancer, coronary disease, animal research and "The Real Work To Be Done."

The author points out that there is no evidence that oral cancer has shown an increase parallel to the growing use of tobacco in the last 25 years, and that there are too many paradoxes in the prevalence of lung cancer in different United States cities, and in different countries throughout the world, to permit a simple linkage with cigarette smoking. For example, in the ten large United States cities examined some years ago by the U. S. Public Health service, the prevalence of primary bronchial cancer in males varied by a factor of over 500 per cent. At time of writing this review, the prevalence of primary bronchial cancer in British males is twice that of United States males, and yet the amount of cigarette smoking per capita is considerably less in Great Britain.

The fact that primary bronchial cancer has not increased proportionately in females, despite much cigarette smoking in the fair sex in recent years, is also alluded to. The striking experience with newcomers to New Zealand is given due mention.

It is mentioned that the death rate in the United States today is about 26,000 per annum (not the 400,000 adumbrated by Doctor Ochsner in his book a couple of years ago).

The paradox in the coronary mortality matter is also discussed. The British investigators find a small increase in coronary mortality amongst heavy smokers, while the American investigators find a large increase. The number of authenticated deaths in either series of cases is of course relatively small.

The author emphasizes the importance of continued research into the carcinogenic factor in cigarette tobacco, if any, and the need for its elimination. He quotes Russ, the British cancer researcher, who observed that of the three common smoking habits throughout the world (tobacco, opium and hemp), there is little doubt that tobacco is the least evil. Used in moderation, it provides solace and some modicum of tranquility.

* * *

PERIPHERAL CIRCULATION IN HEALTH AND DISEASE—Walter Redisch, M.D., F.A.C.P., Associate Professor of Clinical Medicine, New York University; and Francisco F. Tangco, M.D., B.S., Assistant Professor of Medicine, University of the Philippines Medical School, Manila; with a special section by R. L. deC. H. Saunders, M.D., F.R.S.E., Professor and Head of the Department of Anatomy, Dalhousie University Medical School, Halifax, Nova Scotia. Grune & Stratton, New York, 1957. 154 pages, $7.75.

This is an interesting monograph, but is definitely for the specialist in peripheral vascular disease. It is aimed at a physiological understanding of peripheral vascular disease. The first part of the book deals with a detailed description of the anatomy and physiology of the peripheral vascular bed. Pathologic alterations are then discussed. The physiologic adjustments in flow are elaborated in detail and mechanisms of reactivity of the peripheral vessels are detailed. The section on therapy is brief and not too good. This book is not for the clinician, but is for the research worker in the field of peripheral vascular disease.

Victor Richards, M.D.

SYNOPSIS OF OBSTETRICS—Fifth Edition—Revised—Jennings C. Litzenberg, B.Sc., M.D., F.A.C.S., Late Professor Emeritus of Obstetrics and Gynecology, University of Minneapolis Medical School. Revised by Chas. E. McLennan, M.D., Professor of Obstetrics and Gynecology, Stanford School of Medicine, San Francisco. The C. V. Mosby Company, St. Louis, 1957. 403 pages, 163 illustrations, including 4 in color, $6.00.

This compact volume was designed chiefly for medical students but has considerable usefulness for any physician desiring a brief review of clinical obstetrics. In this new fifth edition the sections on maternal and fetal physiology have been rewritten almost completely, and major revisions have been made in many other portions of the book. In fact, scarcely a page has escaped at least minor editing. Quite a number of the outmoded illustrations which appeared in all previous editions have been deleted and replaced by more appropriate figures. The entire text has been reset in a new type face which is infinitely more attractive than that previously used in most Mosby publications.

Because of the effort to compress extensive factual information as well as controversial opinions into a volume which will not overwhelm the undergraduate student, the style of this book is necessarily dogmatic in many places. But the views expressed are generally conservative and are not seriously at variance with those in the major American textbooks, particularly the latest edition of "Williams Obstetrics" (Eastman). Your reviewer recommends the synopsis for the purpose for which it is intended.

* * *

EXPERIMENTAL PSYCHOLOGY AND OTHER ESSAYS—I. P. Pavlov. Philosophical Library, 15 East 40th St., New York 16, N. Y., 1957. 653 pages, $7.50.

This is a valuable book in that it makes available in English some of the basic thinking and writing of Ivan P. Pavlov who is widely known for his work on the conditioned reflex. The book is a selection of his writings ranging from an autobiographical note to extended treatment of Pavlov's work on digestion, blood circulation, higher nervous activity, sleep and related phenomena. As in all such abstractions, there is an unevenness in the space devoted to various topics, but there is grist in the mill for the internist, physiologist, biologist, psychologist and others. A summary evaluation is provided by Kh. S. Koshtoyants—the difficulty here is that it is too brief and one wishes that more interpretive material had been provided. Strangely enough, no editorial credits are given and it is impossible to tell which of the material has been translated for the first time.

Pavlov's contributions may be briefly summarized as follows:

1. He made basic discoveries of the physiological mechanisms of digestion and blood circulation and related them to nervous activity of the organism based upon stimulation coming from the environment.

2. He developed surgical techniques which minimized the damage to the organism under study and allowed observation under more naturalistic conditions than had heretofore been possible.

3. He was an objectivist and gave great impetus to the experimental method in medicine while at the same time seeking clinical correlates of experimental findings.

4. He vitalized the almost dormant Cartesian concept of the reflex and demonstrated its adaptive qualities in nature. In this way he opened a new field of investigation—the stimulus and learning value of the environment and its central correlation in the brain of the animal.

5. His consistent philosophical position was that all behaviour could be explained on the basis of the soma. This led to a counterreaction and to the eventual understanding of the part emotion plays in such behaviour.

Possibly the most valuable portion of this work is the final section where stenographic notes of Wednesday "seminars" are reported. Here the spirit of Pavlov's scientific outlook is best found. He was highly impatient with Sherrington, Kohler, Claparede and others when they departed in any way from what he considered objectivity. During his lifetime he could see no basis for admitting that anything psychical or emotional went on inside the organism.

Pavlov has made exemplary contributions to the psychophysiology of the learning process, gastrointestinal function, vasomotor mechanisms, the roles of excitation and inhibition in the nervous system, and in several other areas. His dogmatism, however, probably retarded the recognition of individual differences, and thus the function of the personality for four or five decades. It remains also to be proved that conditioned reflexes can become unconditioned (i.e., inborn) reflexes through heredity as Pavlov believed.

The volume contains some new and interesting photographs of Pavlov and his home.

ARTHUR BURTON, Ph.D.

* * *

THE CIBA COLLECTION OF MEDICAL ILLUSTRATIONS—Volume 3—The Digestive System; Part III—Liver, Biliary Tract and Pancreas—Prepared by Frank H. Netter, M.D., and Edited by Ernst Oppenheimer, M.D. CIBA Pharmaceutical Products, Inc., Summit, New Jersey, 1957. 165 pages, 133 full-color plates with descriptive text, $10.50.

No one who has received the CIBA literature has failed to admire the exquisite colored drawings of Frank Netter, M.D. This book is a CIBA Collection of Medical Illustrations on the Digestive System, and is devoted to the Liver, Biliary Tract, and Pancreas.

It is magnificently illustrated in colored drawings of striking clarity and brilliant exposition. Complementing these beautiful illustrations is the text which has been carefully written for clarity of expression and breadth of information. The result is an unusual monograph on diseases of the liver, biliary tract, and pancreas. Embryology, anatomy, physiology, clinical disturbances, pathological physiology, and therapy pass in serial review, and each aspect of the subject is superbly treated.

There is no new information in this book. But, the manner of presentation is such that vast stores of knowledge are quickly and concisely presented in a well organized written and illustrated manner. It is an unusual work and one which can be recommended highly to any physician interested in these disorders. The cost is surprisingly low, considering the quality of the book.

Collaborators are used as each discipline brings its knowledge to bear on the Liver, Biliary Tract, and Pancreas. The collaborators include biochemists, physiologists, pathologists, clinicians, but each is complemented by the unparalleled illustrations of Frank Netter.

VICTOR RICHARDS, M.D.

* * *

ATLAS OF NEUROPATHOLOGY—Nathan Malamud, M.D., Associate Clinical Professor of Psychiatry, and Neuropathology, University of California, Neuropathologist, Langley Porter Clinic, San Francisco. University of California Press, Berkeley 4, Calif., 1957. 468 pages, $20.00.

This is a beautifully illustrated book which follows the general plan of a case presentation on one side of the double page and photomicrographs of suitably stained sections illustrating the pathological changes on the other. Reviewers have been critical of the rather sketchy presentation of the clinical picture in the text; this criticism seems unfounded since the work was in no way intended to be a textbook of neurology or even of neuropathology. Supplemented by such a text, the book should be very helpful in the study of neuropathology, and can be recommended highly for this purpose.

HENRY NEWMAN, M.D.

PRACTITIONER'S CONFERENCES—Held at The New York Hospital-Cornell Medical Center—Volume 6—Edited by Claude E. Forkner, M.D., F.A.C.P., Professor of Clinical Medicine, Cornell University Medical College. Appleton-Century-Crofts, Inc., New York, 1957. 378 pages, $6.75.

This is the 6th volume of an eminently successful series of general conferences on a wide variety of subjects. The current volume is an excellent one and includes among its diverse subjects, five chapters on tumors and a very provocative one on "Should patients be told the truth about serious illness?" The presentations are clear, authoritative, have a pertinent bibliography at the end of each conference as well as a summary by Dr. Forkner of the major points brought up in the discussion.

The practical aspects as well as some of the technical concepts are summarized and often unpublished material is presented.

This volume is one of the best of a series and general physicians will profit from reading it. The conferences are specifically oriented toward physicians who are not members of a University Medical Center, but such a person will profit considerably from reading chapters dealing with diseases not in his own field.

* * *

THE EARLY DETECTION AND PREVENTION OF DISEASE—Edited by John P. Hubbard, M.D., George S. Pepper, Professor of Public Health and Preventive Medicine, University of Pennsylvania School of Medicine. The Blakiston Division, McGraw-Hill Book Company, New York, 1957. 350 pages, $7.50.

With some reluctance and hesitation, the American College of Physicians was led to devote one of its regular postgraduate courses to "The Early Detection and Prevention of Disease." It turned out to be popular and widely appreciated. This book is a selection from the informal discussions therein presented.

Dr. Hubbard gives particular credit for planning the course to the inspiration of Dr. Norbert J. Roberts, whose chapter on periodic health-maintenance examinations is an outstanding résumé of the methods and results of this procedure, for which there is increasing demand. He documents the discovery of unsuspected disease among a quarter to a third of those examined, and of untreated (though previously known) disease in an equal proportion. Physical and laboratory examinations are more fruitful than the history in this work. He emphasizes the necessity of adequate discussion of the findings with the patient and follow-up to see that recommendations are given attention. His discussion of the relative efficiencies of various laboratory procedures and the criteria for selecting those best applied in differing circumstances is highly valuable.

Other outstanding contributions from Paul White on cardiovascular disease, Thomas Almy on gastrointestinal disease, Henry Bockus on malignant neoplasms, Katharine Boucot on lung cancer, and Hubbard on rheumatic fever, are of nearly equal thoroughness and persuasiveness, and make the book well worth having. Frederick Liebolt gives a straightforward description of the technique of examining the musculoskeletal system, which, if not inspiring, is highly practical. Those who learn to follow his methods will do better work with little increased effort. Some twenty others, mostly Philadelphians, cover a wide variety of topics.

In an opening chapter, Lemuel McGee says that much of the current practice of internists is in the field of preventive medicine, but suggests that both the quantity and quality can be greatly improved. He blames the lack of more effective application of preventive principles upon the unreadiness of the public to purchase such service and (quoting Vines) upon the divorcement of preventive from clinical medicine and its forced marriage to public health. While one may not agree with his reasons, the implied conclusion is acceptable: Clinicians should prepare themselves for the early detection of deviations from health and for instruction of their patients in dietary and other measures for health maintenance. This calls for thoroughness in examinations and skill in interpreting their findings and explaining appropriate action to be taken. This book is the best available explanation of how these things can be done. It expresses both the theory of disease prevention and practical methods by which it can be accomplished by practicing physicians.

RODNEY R. BEARD, M.D.

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PROGRESS IN GYNECOLOGY—Volume III—Edited by Joe V. Meigs, M.D., Clinical Professor of Gynecology, Harvard Medical School; and Somers H. Sturgis, M.D., Clinical Professor of Gynecology, Harvard Medical School. Grune & Stratton, New York, 1957. 780 pages, $15.50.

The third volume of the Progress in Gynecology, edited by Meigs and Sturgis, recently has been presented to the medical profession by Grune and Stratton of New York and London. As in the two previous issues the subject matter has been grouped under ten headings, namely Growth and Physiology, Diagnostic Methods, Functional Disorders, Interrelationships of Endocrine Glands, Sterility and Reproduction, Infections, Benign Growths, Malignant Growths, Operative Techniques, and Pre and Postoperative Care. A total of fifty-five subjects is here discussed in adequate detail to serve as a reliable and quick reference for the busy practitioner. Not all of the material is new but it has been reevaluated in line with advancing knowledge and therefore is important. There has been added, however, considerable new material to complement subjects discussed in previous issues of the Progress. In order to avoid repetition the editors have selected an entirely new group of contributors, among them several renowned foreign gynecologists. Not every opinion expressed necessarily conforms with those held by others of equal experience which is refreshing and stimulating.

The fifty-five subjects range from such a relatively new subject as ovarian cortical stromal hyperplasia and its relation to estrogen production past the menopause to the techniques of urinary diversion into the intestinal tract in the presence of blocking carcinoma of the pelvic outlets. It would go too far to discuss the intervening subject matter but the reader will be well rewarded by perusing such problems as the applicability and techniques of the several forms of irradiation for pelvic cancer and the advantages and disadvantages of preoperative irradiation. Where the physics of irradiation are mentioned the average reader will find no difficulty in interpreting them into clinical values. Among the more controversial subjects the mechanism of pelvic pain, the so-called Stein-Leventhal syndrome and the psychosomatic disturbances manifesting themselves as pelvic dysfunctional disorders are discussed without prejudice or dogma which gives the reader ample chance to compare opinions and come to an independent conclusion.

As might be expected there is considerable discussion of the diagnosis and treatment of the earliest states of pelvic cancer. Also here, ample chance is found to compare opinions regarding methods of treatment. The same holds true of the study and correction of infertility. Endocrine disorders and their manifestations in the generative organs have received adequate attention although these chapters add little to our current knowledge. All in all, the third volume of the Progress in Gynecology is an excellent computation of advancing thought on matters gynecologic and can be highly recommended as interesting reading matter.

Grune and Stratton present the book to the profession attractively bound, printed on good paper in clear type and well illustrated.

LUDWIG A. EMGE, M.D.